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ALL ARRANGEMENTS have been made for shipments of iron ore from the Lake Superior region, which are expected to exceed even the great record of last season. On the Mesabi Range all the large mines have stock piles, from which loading can be begun at once. The Old Range mines also are prepared for heavy shipments, as a great deal has been done during the winter. Doubtless the first shipment will be recorded this week.

⚒

THE NAVIGATION of the Lakes has been formally declared open, the canals at the Sault Ste. Marie being prepared to pass vessels. The sailing of the first vessels from the lower lake ports is delayed, however, by a general strike of the firemen and oilers. It is uncertain how long this will postpone the starting of vessels. Many are already loaded with coal, which is urgently needed in the Northwest; while the docks on Lake Superior are full of iron ore ready for shipment.

THE DEVELOPMENT of systematic mining in the Yukon is illustrated by the extract which we give elsewhere, from the excellent report of Dr. Eugene Haanel, Dominion Superintendent of Mines. The rough methods of the pioneers are being superseded by the use of machinery, and by working on a large scale. The results will doubtless be seen in an increase in the gold production from the region. Already it is becoming possible to work ground which the first prospectors passed by, and to re-work the tailings which they left.

⚒

OUR FRIENDS in Great Britain and Germany are in the habit of finding fault with the American system of driving furnaces at high pressure, as extravagant. The furnace does not last, they say; everything is worn out in a short time, and must be renewed. To these critics we can instance the experience reported with Furnace H of the group of blast-furnaces at the Edgar Thomson Steel Works. This furnace is now receiving a new lining, to replace one which was in active use for nine years and four months. This would hardly be called a short life anywhere. The furnace is 90 ft. high and 20 ft. in diameter at the bosh; and it has been run at high pressure ever since it was built.

⚒

MAKERS OF iron and steel, as well as the naval authorities, have taken interest in the contest between armor and projectiles, which has been going on ever since the first ironclad warship was built. The contest has had many vicissitudes, but for two or three years past the projectiles have had the best of it. The steelmakers do not seem to be able to produce armor plates sufficiently hard and thick to resist the projectiles now used, with the velocity they receive from the latest types of guns. It is not surprising that some naval officers have recently been bold enough to advocate at least the partial elimination of armor, and a return to the old conditions when battery power and quickness in manoeuvering were the elements of superiority in a warship. It is claimed that these qualities could be much improved, if we could dispense with the 600 tons or so of armor now put on a first-class battleship. Meantime, the steel men seem to be at a loss for any way of bettering their armor-plates.

⚒

THE EXTREME of economy in railroad transportation seems to have been reached on the Pittsburg, Bessemer & Lake Erie Railroad. This line was built to haul iron ore from Conneaut, on Lake Erie, to the furnaces around Pittsburg, with coal from the mines of the Pittsburg District as a return freight. In 1902 the road carried 6,679,368 tons of freight, the ton-miles reported being 852,734,808, and the average haul 127.7 miles. The cost of handling freight was 0.222 cent per ton-mile, a figure which, we believe, has seldom been bettered. It was, however, greater than the same road reported in 1901, when the cost was 0.187 cent per ton-mile. The average freight train load last year was 913 tons, against 940 tons in 1901. These changes were due to the fact that the ore traffic last year exceeded the coal business, making it necessary for the road to haul a larger number of empty cars than in 1901. The cost was also increased by higher prices of fuel and supplies. Even on last year's figures, the record is a remarkable one.

⚒

IT GIVES US pleasure to hear that the Exploration Company, of London, is now recovering from the difficulties which beset it a year or two ago. An interesting point in connection with the vicissitudes of the company that does not appear to have received attention deserves notice. The company was originally formed at the late Hamilton Smith's suggestion to acquire mining properties of all sorts, develop them, and float them as separate companies; also to acquire shares in other mining companies and hold for a rise. While that policy was adhered to everything went prosperously. After Hamilton Smith's time his successors in the control advised that industrial propositions should also be taken up.

It was pleaded that mining was risky, and that the inclusion of industrials within the scope of the company's dealings would help to bring steadiness. As it happened, however, the choice of the industrials was at fault, and was the actual cause of the company's narrow escape from wreck. Mr. Bayliss has gone back to the old policy and relies on legitimate mining.

In view of Mr. Bayliss' high reputation as a successful mine manager this is a natural decision; but it may also be taken as a tribute to the value of mining investments. The company was successful so long as it kept to mining, and is now saving itself by returning to the original field.

⚒

WE PUBLISH AN excerpt from the address made by Mr. Hennen Jennings, as president of the Institution of Mining and Metallurgy, at London. The younger brother of our American Institute of Mining Engineers is to be congratulated on having as its titular head a mining engineer so representative of the best professional practice. Mr. Jennings is now in South Africa, where he won his high rank as a consulting mining engineer, and the presidential address was therefore read by proxy. It is the contribution of a busy man and is full of data pertaining to the industry—that of the mines of the Rand—to which Mr. Jennings has devoted his career. At the present time the best men at Johannesburg are devoting their energies to the solution of the labor problem, and it is noteworthy that in this effort, as in other matters of less importance, English and American engineers are co-operating as a unit. Mr. H. Ross Skinner, representing the Chamber of Mines, of Johannesburg, was in New York, this week, on his way to the Pacific Coast and to the Orient, with a view to investigating the matter of utilizing the Chinese coolie. In all these matters we wish our professional friends in South Africa a successful outcome, for they represent not one region alone but the industrial development of mining as a whole.

⚒

THE PRODUCERS of nitrate of soda in Chile have entered into the third year of their five-year compact, which expires on April 1, 1905. This combination is unique, in that it has a complete monopoly in an article which is of great industrial importance, and which is produced in commercial quantities only in Chile and Peru. Since its organization the combination has, by energetic propaganda, greatly increased the consumption of nitrate of soda, and by a systematic adjustment of production to the export demand, it has succeeded in establishing high prices, that have yielded substantial dividends to those engaged in the industry. So much for the past. Now in beginning its third year the combination is confronted by difficulties which seem likely to create dissentions among some of its members. Foremost is the matter of readjusting the quota of production allowed to the respective members, in order to admit the new oficinas that have started, and the older works that have been rehabilitated since the organization of the combination. Simultaneously it will be necessary to consider the lower prices that are now being obtained for nitrate of soda, which, on a curtailed individual allotment must yield smaller profits, and incidentally smaller dividends to stockholders. True, the ocean freight market—an important factor in the industry—is lower than it was a year ago; but the difference does not fully compensate for the reduction in the selling prices of nitrate of soda. On the other hand, much will depend on the recovery in the beet sugar industry in Europe, which is the largest consumer of nitrate in the world. The demand in the United States is increasing, but as it constitutes only about 18 per cent of the world's consumption, it can have comparatively little influence on the policy of the combination. It will also be interesting to watch the developments of the California nitrate beds, which are now being diligently prospected. Summed up, it looks as if the Chilean producers will experience more difficulties in the closing years of their compact, than they have heretofore encountered.

⚒

GOLD MINES IN EGYPT.

On another page we publish a few data concerning the recent activity in gold mining in Egypt and the relatively greater development of a new department in company promotion in London. Our correspondent in that city gives further information in his last letter. It appears that the Egyptian portion of the London mining market has been very lively of late, and that an air of seriousness has been given to the flotation of numerous exploring companies on account of the fact that Mr. J. B. Robinson, the South African mining magnate, had agreed to take an interest in one company; while, at the same time, the acceptance of the general management of another company by the firm of John Taylor & Sons has certainly strengthened the movement by associating it with a highly reputable firm of mining engineers. So far, so good. Now comes a touch of humor, in the refusal of the Egyptian Government to sanction the reconstruction schéme put forward by the Nile Valley Company with a view to getting Mr. Robinson's participation. The Egyptian Government refuses to allow its territory to become the scene of irresponsible speculative schemes. We present our compliments to the gentleman who control the destinies of the land of the Pharaohs. It has been left for the government of a country which can boast of the earliest mining operations known to human history to set an example which the greater mining regions of younger countries might well imitate. Nothing hurts the mining industry of a newly developing district so much as the blowing of promoters' bubbles by means of the windy breath of a premature boom, and if the Egyptian Government is really in the happy position of being able to control the vagaries of speculation and intends to use that power for the good of the country, we, no less than our Australian and South African friends, will be compelled to recognize that an example has been set which is beyond the dreams of reformers in countries governed on more liberal principles.

⚒

THE COST OF MINING ANTHRACITE.

It would be natural to suppose that the reduction of the anthracite coal output by nearly one-third in consequence of the strike would result in considerable changes both in the selling prices and in the cost of mining coal. We know, of course, that selling prices to final consumers were largely increased during the strike, but we refer here not to the price paid by the final consumer, but to that realized by the mining companies. So far, however, as information is accessible for the past year, this does not appear to have been the case. We have now the reports of two important anthracite companies, the Delaware, Lackawanna & Western and the Delaware & Hudson, covering the calendar year 1902, and these reports are almost the only statements made by any of the anthracite companies which give any details of the cost of mining coal. Between these two companies, moreover, there is the similarity that they operate their coal mines directly and not through the medium of a subsidiary corporation, so that the mine accounts represent an important part in their financial statements. Taking the reports of the two companies mentioned, we obtain the following table showing the average receipts and costs of coal mined in 1901 and 1902. They represent some points of similarity and some points of difference from which a few conclusions can be drawn:

	—D., L. & W.—		—D. & H.—	
	1901.	1902.	1901.	1902.
Coal sold	$3.69	$3.55	$3.35	$3.82
Mining	$1.54	$1.58	$1.54	2.14
Transporting	1.67	1.59	1.39	1.19
Handling	0.19	0.16	0.04	0.05
General expenses	....	....	0.10	0.16
Improvements	0.07	0.07	....	....
Total cost	$3.47	$3.40	$3.07	$3.26
Net receipts	$0.22	$0.15	$0.28	$0.28

It will be seen that in 1901 the reported cost of mining coal per ton was the same in both companies. This would be a probable result, as their mines are in nearly the same section of the anthracite field, and the conditions of working are very nearly alike. In 1902, however, the Delaware, Lackawanna & Western reports an increase of only 4 cents per ton in the cost of mining, while the Delaware & Hudson shows an increase of 60 cents, or about 40 per cent over the former year. In view of the fact that the cost of pumping and of other charges have remained nearly constant, while the production fell off about one-third, the Delaware & Hudson statement seems to conform more closely to what we might expect. On the other hand, it is quite possible that the comparatively small increase in the Lackawanna mines may have been due to smaller charges for deadwork, new openings and the like. The Delaware & Hudson result shows a much larger increase than that reported by the Lehigh Coal & Navigation Company, which states that in 1902 the cost of mining coal was $1.85 a ton, an increase of 30 cents a ton over the previous year.

With regard to transportation, it will be observed that there was a reduction in average cost in the case of both companies, although with the Lackawanna it was only 8 cents a ton, while with the other company it amounted to 20 cents per ton. This reduction is easily explained by the fact that the proportion of coal used at the mines and that used for railroad purposes on which the freight charges are much less than on coal sold, was much higher last year than in the previous year. Naturally the necessities of the case were first met. It will be observed from the table that the Delaware & Hudson reports a much lower cost of transportation in both years than does the Lackawanna. This arises from the fact that the Lackawanna coal is handled almost entirely by the company's own lines, and that the rate charged is comparatively high. The Delaware & Hudson, while it does a large coal business on its own lines, delivers that considerable portion of its coal, which goes to tidewater, over the roads of other companies, and on this tidewater coal it obtains a very low freight rate.

With regard to the other charges for handling and

general expenses, there is no great difference, the divisions under the different heads resulting from different methods of bookkeeping.

With regard to the average price obtained for coal sold the Delaware & Hudson shows a fair increase, of 47 cents a ton, while in the case of the Lackawanna there was actually a decrease of 14 cents. In the latter case, however, this is explained by the fact above alluded to that the proportion of coal used by the company's railroad was much greater on the lower production, while its report shows that a lower price for this coal was charged last year than it had been previously. Taking out the company's supply coal the sales at agencies were made at about the same price in both years. This would seem to dispose of the popular belief that the high prices charged locally during the strike went directly into the pockets of the coal companies. From the reports it would appear that the net profit of coal per ton realized by the Delaware & Hudson was the same in both years, while that obtained by the Lackawanna was actually less last year. There is no reason to doubt that the figures of these reports are substantially correct, for neither company would have any special motive in attempting to cover up losses or profits by bookkeeping methods, and the present managements of both companies have always shown a disposition to take stockholders and the public into their confidence, and to make reasonably full reports.

The interesting feature, however, is the fact that the figures show results differing widely from those generally expected, although they occasion little surprise to any one familiar with the anthracite trade.

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MARKET CONDITIONS.

While the foundation of the metal market continues strong and the undertone is generally good, there have been some reactions in prices during the past week, but these have not seriously affected the demand.

Copper has been somewhat nominal during the week; actual transactions having been on rather a limited scale. A small reaction in price, which was largely due to speculative influences, had little effect upon the buying, and although quotations at the close showed the effect of this reaction, the situation continues strong. There is very little copper to be had for immediate delivery and most producers are sold up for some time ahead, while consumption continues at an unparalleled rate. The foreign market shows a decided falling off in standard copper, although best selected and electrolytic remain comparatively steady. The reaction in price here was taken very seriously on the other side and coupled with the pessimistic tone of the foreign papers, and the fact that the almost complete separation of general trade from Wall Street, which now exists, is not realized there, brought about a sharp fall in standard. It is reported that on the decline some purchases of standard copper were made in London, to be shipped here to be refined.

Tin has shown some fluctuations, but upon the whole, the demand continues good and consumption steady.

Lead remains unchanged, and although some consumers have been inclined to anticipate a reduction in price, none has taken place.

Spelter shows some reaction from the very high point to which prices were carried on the recent rise in this article. Prices continue very good, however, and the smelters do not seem to be seriously disturbed. Prices of ore continue high, but local conditions are improving in the Joplin District, and in another week or two, unless there is some unexpected bad weather, the roads will be in better condition and ore will come out more freely.

Silver remains comparatively strong, the purchases for Philippine coinage, and for Indian account supporting the price, which is better than for some time past.

In the iron market the principal incident has been the reduction of $1 a ton for No. 2 foundry as the basis, made by the Southern furnaces. Buyers are claiming this as an important concession, due to their waiting policy. The iron-makers, however, say that it is the result of a well considered policy, and that no further concessions for present-year deliveries will be made.

The Western coal market is comparatively quiet. Local supplies are now generally abundant, and attention for the time being is directed to the opening lake trade. Very little is said about the general increase in prices throughout the West, as this was anticipated and felt by consumers to be a necessity.

The Atlantic seaboard bituminous trade is generally quiet, with no immediate prospects of greater activity. Contracts for the new year were closed at prices which showed considerable variation. The outlook for labor troubles is much less threatening, and strikes are not expected, except possibly in a few districts.

In the anthracite trade the new schedule of prices brought out a rush of orders for coal during April, and it is altogether probable that consumers will be unable to obtain much of the coal ordered for this month, and will have to take it at May prices. The mining companies, in spite of some friction with miners over the awards of the Anthracite Commission, are doing their best to get out as heavy a tonnage as possible. Indications are that this year's output will surpass that of 1901.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

The end of a celebrated mine is recorded. From Prague we learn that the Kuttenberg silver mine, in ancient times of great importance, has now been definitely closed down. Mining was re-started at Kuttenberg in 1880, but the fall in the price of silver militated against success. It is even a matter of common knowledge that the famous Przibram silver mines are no longer profitable undertakings. The Government continues mining operations in order to maintain the School of Mines and to provide the miners with a livelihood.

Molybdenum and titanium produce fast shades on leather. Molybdenum tannate has a great affinity for animal fiber. It is a deep yellow color, but a large variety of shades can be obtained by employing it in connection with logwood extracts.

In Greece almost all the marble quarries belong to an English company. In 1897 the output was 756 cubic meters; in 1901 it had risen to 4,355 cubic meters. In Austria-Hungary the greatest proportion of the marble imported is Italian. This is also the case in China. The best market for Italian marble is the United States. In 1902 the imports represented a value of $1,435,454.

A fact in itself has no significance; neither have a thousand facts. What gives facts their value is their relation to each other; for when enough have been collected to suggest a sequence of cause and effect, a generalization can be made which scientific men call a "law." The law amounts only to this, that certain phenomena have been found to succeed each other with sufficient regularity to enable us to count with reasonable certainty on their recurrence in a determined order.

Egypt was the California of the ancient world. The kings of Assyria and Babylonia obtained their gold from the Pharaohs. A papyrus has been found describing the mines of Akita in the Eastern desert, which were reached from the Nile at a point near the modern Dakka. A great mining people lived in the mountains between the Nile and the Red Sea in the days before the Ptolemies. Scarcely a trace of them survives, but the gold mining industry is now being revised under English auspices.

The question of erecting a platinum refinery in Russia is receiving serious attention. Hitherto the Russian platinum, representing 95 per cent of the world's supply, is exported in a crude state at a price of 13,000 roubles per pood. The refined platinum is sold at about 25,000 roubles per pood, while the cost of refining is stated not to exceed 300 roubles per pood.

Wolframite, hubnerite and scheelite are the three minerals from which tungsten is derived for the making of a special steel. Sodium tungstate is still used to some extent for making colored cotton goods "fast" or washable. The metallurgical properties of its alloys have given the metal tungsten a greatly increased commercial value.

Wolframite is a tungstate of iron and manganese. Hubnerite is essentially a tungstate of manganese alone. These two minerals resemble each other, the first, however, is usually dark gray, while the latter is brownish-red to nearly black. Scheelite is a tungstate of lime, it is very heavy, yellowish white and possesses a dull adamantine luster. Scheelite is often associated with gold-bearing quartz. This association has been noted in Oregon and in New Zealand.

Graphite-bearing schists are of widespread occurrence in the Central Alps, but they are rarely rich enough to constitute deposits of economic importance. In these deposits the carbon that has assumed the form of graphite is a primary rock constituent of undoubted organic origin. It is not assumed that the coal was transformed slowly into graphite, but that the process was quickened by the high temperature of the granitic magma.

Gold was first discovered by the Russians in 1744, near the town of Ekaterinburg, 6 miles to the northwest, at a village now known as Berezovsk. From this and other descriptions of the find, it appears that this was free gold in quartz, probably from one of the numerous stringers which penetrate the granite of that region, which granite is generally referred to as beresite. Although the first find was gold quartz, it was from placers that the first production was made. In 1814 alluvial gold was worked in the Urals, for the first time, and in 1820 in the Altai region of Siberia.

The Gympie District, in Queensland (Australia) is entitled to distinction in having workings which are now 3,000 ft. deep. In the West-of-Scotland Mine gold-bearing quartz was recently struck in the shaft at a depth of 3,014 ft. The ore is stated to be 8 ft. wide, and contains visible gold. During January, 1903, the Gympie District produced 7,546 tons of ore, yielding 6,246 oz. gold. The occurrence of gold is intimately associated with beds of black slate, the quartz veins becoming productive when they penetrate these slates.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

ESTIMATES OF ORE IN A MINE.

To the Editor:

Sir.—The letter of Mr. George E. Collins, in the issue of the JOURNAL for March 14, 1903, continuing the discussion in regard to sampling and estimates of ore, induces me to offer a few suggestions along the same line of criticism. Mr. Collins says, "The amount of weight to be attached to exposure on four sides, on three, on two, or on one only, varies with the conditions of each particular case." And further on, "And I distrust all cast-iron classifications which do not allow for the infinite complexity of natural conditions."

However much ability the man to whom the examination of a mine is entrusted may have to sample the available ore geometrically blocked out, he is unworthy the confidence reposed in him, if he is unfamiliar with, or neglects to take cognizance of, the principles which govern the deposition of ores. A knowledge of these geological principles implies not only mineralogical training, and a knowledge of the broad general rules by which ore deposits, through the accumulation of experience, have been classified, but it includes a consideration of the nature of the enclosing and adjacent rocks, and, what is most important, a recognition of the phenomena of ore-shoots.

The much-abused term, ore-shoot, or shoot of ore, as applied to mineral veins, may be defined as that portion of a metalliferous deposit within whose boundaries the mineral mass is commercially valuable. This definition purposely omits specifying the shape of an ore-shoot, and any reference to the reasons for its existence. It is evident that the form and size of the ore-shoots in a given mine must depend, not on any scientific law, but, for the most part, upon the actual working expenses. In a mine which has been worked for a period of years, the worked-out portions of the vein usually afford, by their form and dimensions, a fairly reliable index of the size and shape of the ore-shoots for that mine, but for that mine alone.

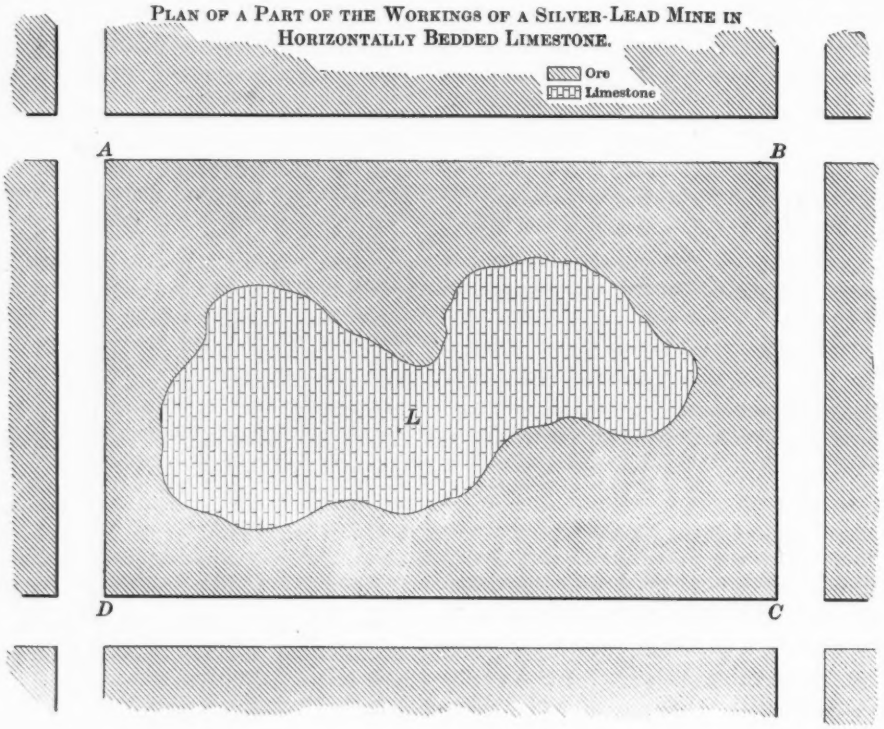
The mining engineer who examines and reports on a mine in which the ore-shoots have thus been defined by local experience may commit an act of injustice to the intending purchasers, to the vendors, and to himself, if he neglects to moderate his calculations, based upon the actual sampling of ore blocked out, by a proper consideration of the system of ore-shoots, as developed by previous workings.

In a mine whose workings are on a fissure-vein, experience has shown that the ore-shoots, lying in the plane of the vein have frequently a considerable amount of regularity, as regards size and distribution. This is especially the case in veins whose principal gangue is quartz, and whose values consist of any or all of the minerals, gold, silver, lead, and copper. The engineer should consider it a part of his duty to ascertain if the characteristics of the ore-shoots in the vein he is examining are peculiar to that particular mine, or are duplicated in other mines of the same district. The gathering of such data is frequently rendered impossible by local jealousy or other motives. The data are usually obtainable, however, and sometimes detailed published maps of the district in question exist. In most large mining districts of the world, both surface and underground data have been published and are available for those who care to use them. If the vein under examination is one of a series, upon which operations in different mines have been conducted for a long period, and which have been shown to present a uniformity or similarity of conditions, the engineer has a largely increased supply of material at hand from which he may draw his conclusions.

To take another example of ore-deposits, if the mine in question is operated on a silver-lead bedded limestone deposit, of the kind sometimes referred to as a "contact," the form of one ore-shoot may afford no clue as to the form of the next one to be encountered. From the very origin of such a deposit, it may generally be assumed that the occurrence of the ore will be subject to less definite laws than is the case in fissure veins. It is occasionally found, however, that a definite local disposition of the ore in shoots in a bedded silver-lead or zinc deposit occurs. The engineer, in examining a mine in which such an occurrence has been proved by the work already done, will naturally be at fault if he takes no account of the history of the property, and its previous underground development. He will, however, be likely to exercise unusual caution in estimating the three classes of "positive," "probable" and "possible" ore, when dealing with a class of deposits which are genetically connected with the chemically induced replacement of limestone by metallic sulphides.

In the accompanying diagram (plan) the ore-body represented is an occurrence in a limestone

PLAN OF A PART OF THE WORKINGS OF A SILVER-LEAD MINE IN HORIZONTALLY BEDDED LIMESTONE.



bed, say, 7 ft. thick. The bed, itself lying flat, is heavily mineralized. The carbonate of lime has been replaced by metallic sulphides carrying values. The enclosing beds, namely, those lying above and below, are barren, and the mineralized bed itself contains barren patches, sporadically distributed. Assume that the ore-body thus defined, a portion of which is here represented, had dimensions as follows: Seven feet thick, that is the thickness of the limestone stratum, 150 ft. long and 90 ft. wide. The four tunnels represented are all run in this ore-body, and by their intersections enclose a portion of it, A B C D. In other words, a block of ore is exposed on four sides, 7 ft. thick, 45 ft. wide, and 70 ft. long. If one should apply an arbitrary rule of sampling in the examination of the mine in which this case occurs, the ore in question must be classed under the head of "positive." While not questioning the correctness of this classification, I have endeavored to show, by the diagram, the error to which the examiner would be liable, should he estimate the block represented by A B C D as ore. On the other hand, if the examiner takes into consideration the geological principles on which the class of limestone silver-lead deposits depends, he will probably allow in his calculations for the possibility of the presence of the patch or horse of barren limestone L. At any rate, he will be most assiduous in his efforts to find out if patches of normal limestone, unaffected by the ore-bearing solutions, have been encountered in previous workings of the mine, or in the surrounding mines of similar character.

The term ore-shoot may be said to be a development of the experience of that invaluable member of the mining profession, the mine foreman. His every-day contact with the ore, and with the profit and loss conditions of handling it, makes him keen to recognize its slightest variations, so far as can be judged from its appearance. The very fact, however, that the term, "shoot of ore," has primarily a commercial and not a scientific definition, has resulted in an exceedingly loose application of it. Would it not be an advisable point for discussion as to whether the word "shoot" should not be more closely limited in its uses.

A fissure may be primarily of varying width, especially when the enclosing walls are slates or metamorphic schists, and the vein is conformable in strike with their schistosity. The vein-filling, or ore, with which the fissure has been filled, may, when drifted on, present at one station a width of 6 ins., and at another, perhaps 100 ft. farther along, of 6 ft. Assume that the ore carries 0.5 oz. in gold. There may be a recurrence of the wide and narrow portions of the fissure, giving a succession of lenses of ore. Naturally the drift must be carried wide enough for the operations as long as the vein is followed. The vein will be stoped only in those portions where the vein-filling widens to such an extent as to warrant its being extracted and milled, or, in other words, where it may be defined as pay-ore. In those parts of the vein where the vein material occupies only 6 ins., or possibly even a narrower space, no more ground will be broken than necessary, and the foreman will define the intervening narrow space along the drift, between any two lenses of ore, as barren ground. His "shoot" will be limited in its length along the drift by the imaginary planes between which the two walls of the lenticular opening in the vein contain sufficient ore to be profitably extracted. All inside the wide part of the vein will be the "shoot," and all outside will be reckoned, for the time being at least, as "barren ground."

On the other hand, take the example of a fissure vein, with straight parallel walls, and with a width of 3 ft. The filling is quartz-gangue containing sulphides, and the width does not vary for long distances. In certain portions the operations have shown that high values in gold and silver occur in the vein-matter, while other portions, indistinguishable by their physical characteristics from the ore, are practically waste-rock. I need not recall to

miners, and to those familiar with mines generally, how frequently such alternations of rich and barren vein-matter occur.

The last case cited is, according to the present system of nomenclature, as much an occurrence of ore in shoots as is the instance of the vein of varying width in slate country, where the distribution of the shoots depended on the form of the original fissure. In the one instance the shoot resulted from physical causes; in the other the distribution of the shoots was due to chemical differentiation in the solutions from which it was deposited. Explanations of the selective activity exhibited by these solutions, resulting in the formations of shoots of ore, are up to the present, largely speculative. In addition to the above two classes of ore-shoots, must be considered those occurring in connection with fissure-veins in bedded deposits. In these the chemical action resulting in their formation has been in some cases controlled by physical causes. A consideration of them is hardly pertinent to the point I have raised regarding shoots in fissure-veins.

I can hardly allow to pass one point made by Mr. Collins, in his valuable letter. In Fig. 2, of the illustrations accompanying his article, he shows "a case which is typical of perhaps the largest number of ore-bodies in fissure-veins." The shape of the ore-body figured by Mr. Collins, I am inclined to think, is of a rather exceptional kind. From the context it is to be inferred that Fig. 2, of Mr. Collins, represents a shoot of ore, in a vein. Shoots of ore in fissure veins, as they have been defined above, my experience has induced me to believe, have in the majority of cases a lenticular form, whatever their origin. A definite pitch in the plane of the vein is generally characteristic of them. The pitch may make any angle with a horizontal line representing the strike of the vein. The longest axis of the shoot may form a right angle with this horizontal line, or again the longest axis of the shoot may coincide with the horizontal, constituting the "course" of the Cornish miner. The main point I wish to make is that that in the majority of cases hitherto noted, it has been found that the longest axis of an ore-shoot is a straight, or nearly straight, line, and not a curved line in the sense figured by Mr. Collins.

My contention is not that ore-shoots of very irregular form do not occur, and the above criticisms and remarks are offered mainly in the hope that those who have observed the phenomena extensively will record the results of experience. The literature of ore-shoots is not ample, and no one will deny that the subject possesses much practical interest and importance in its relation to the mining industry.

C. W. PURINGTON.

Denver, Colo., March 24, 1903.

IMPURITIES IN COMMERCIAL CYANIDE.

To the Editor:

Sir.—Referring to your editorial in the issue of April 4 and to the articles in correspondence columns of previous issues, in relation to commercial cyanide of potassium, the presence of cyanide of sodium does not wholly account for the present very impure article of commerce. In the early days of cyanide manufacture the bases used were synthetical ferrocyanide of potassium, by-product ferrocyanide of potassium, or impure ferro-ferri-cyanide (Prussian blue), both recovered from the oxide of iron purifying material used by gas works. About 1895, direct extraction of cyanides from the gas was substituted for extraction in the purifiers, and later, about 1898, I think, the conversion of ammonium sulphocyanides, previously a waste-product from both the ammonia scrubbers and the gas purifiers, was successfully initiated.

Broadly speaking, nearly 40 per cent of the available cyanic acid in coal gas is recoverable as ammonium sulphocyanide, which is converted into commercial cyanide by chemical methods too various and intricate to discuss at this time. But from the initiation of this latter method of cyanide recovery, dates the encroachment of alkaline sulphides on the commercial product.

Insistence on cyanide of potassium derived from the ferrocyanides will doubtless save the consumer the annoyance of purifying his solutions; but as the conversion of the sulphocyanides is more profitable to the patentees than some of the older methods, the presence of at least traces of sulphides may be expected for some time to come, and should certainly be guarded against.

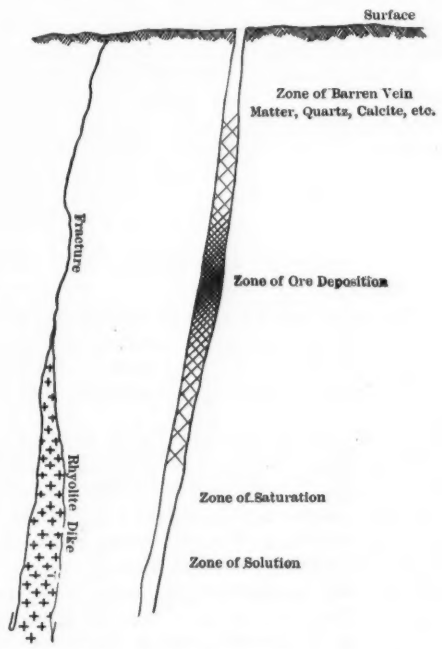
HENRY A. MATHER.

New York City, April 4, 1903.

SECONDARY ENRICHMENT AT CRIPPLE CREEK.

To the Editor:

Sir.—The discussion of the possible origin of the newly-discovered gold and copper bonanzas of the deep levels at Cripple Creek has brought out the opinions of a number of men familiar with the ground, and therefore well qualified to discuss the evidence. It is, therefore, with considerable reluctance that I venture to enter the discussion, for, although I have carefully examined a considerable number of the specimens, it is impossible, without a careful study of the structural relations of the ore



bodies and an examination of the mineralogical association of the ores and the adjacent portions of the lode and country rock, to pass a final judgment. I have, however, carefully considered both the evidence presented and the arguments advanced by the mining engineers who have contributed to this discussion, and in the light of my own experience and the examining of many ore deposits for the express purpose of determining their possible secondary origin, I am convinced that the evidence so far advanced favors a *primary* origin for the deposits of gray copper found at the deep levels.

The satisfactory explanation of the occurrence of ore-shoots is one of the most difficult problems of the study of ore-deposits. In my original paper, written before the corroborative evidence of Emmons or the theoretic conclusions of Van Hise appeared, I was inclined to believe such bodies to be frequently of secondary origin. This is now known to be true for many deposits, but a word of warning is needed lest our friends accept this theory as applicable to all cases.

Primary ore-shoots do exist in many instances, well-known examples being those in the California gold-quartz veins examined by Lindgren. Ore-shoots of secondary origin, but resulting from later ascending or hot solutions, also exist. The latter, there is good reason to believe, are more common than is usually supposed, but there is still another factor which must be considered, and that is the orderly vertical distribution of primary ore-deposits by ascending currents. Concerning these, I have already written in a paper upon the mineral vein-formation at Boulder, Hot Springs. The accompanying diagram shows the assumed conditions in these hot springs, conditions which it is believed prevail in many others. For convenience, let us assume a straight fissure, which may be 10,000 or 20,000 feet, and in which the waters move upward somewhat slowly. In its lower part heat and pressure are very great, and the waters are not saturated even for the most soluble substances, and no minerals are deposited, these conditions being the same as those prevailing in the deep-seated rocks traversed by the waters before they reached the fissure. Nearer the surface of the earth diminished heat and pressure make the water incapable of holding the less soluble materials in solution, forming what may conveniently be called the zone of saturation. Some salts, like alkaline sulphates, being extremely soluble, are not deposited, since the point of saturation is scarcely ever reached in nature even at the earth's surface. Others, like silica, may be present in such amount as to saturate the water, but cooling and relief of pressure cause super-saturation and precipitation. Still higher in the hypothetical hot spring tube, diminished heat and pressure cause the separation out of the less soluble constituents, practically all the metallic sulphides, and for such materials this part of the tube is the zone of precipitation. The more soluble substances will be carried further upward before precipitation, and one may suppose if the solubilities of the substances were sufficiently unlike that zones would be formed consisting mainly of the particular substances thrown out by the change of pressure. This would produce an orderly distribution of the ores in a vertical direction. This has frequently been observed in ore-deposits. In the writer's own experience, the order appears to be galena on top, passing into highly zinciferous ores below, and these into low-grade pyrite. This would also account for impoverishment in depth and the passing of the ore into the ever-present and readily-deposited silica. It would also explain why it is so seldom that hot springs deposit metallic sulphides at the earth's surface. The Sulphur Bank quicksilver mines of California are examples. It is probable that somewhat analogous conditions exist in many hot spring localities, and if we could expose the lower part of the conduit we should find ore deposits.

The attempt to explain ore-shoots as the result of reactions between solutions coming in from cross fractures has been made by some writers, but the evidence accumulated does not support this view. In my own experience, as in that of Lindgren, such cross-fractures are unfavorable to the occurrence of rich ores. There is good evidence for three successive periods of primary ore deposition at Butte, Montana, besides the so-called secondary enrichment by descending waters. The term secondary is a misleading one, and as one of its sponsors I apologize for its use, since at Butte, for instance, the enrichment by descending waters must be quaternary. I await, however, a better term, and shall not attempt to impose a new one upon our overburdened nomenclature.

Concerning the secondary origin of the gray copper, it must be remembered that it can be formed in different ways. It is true that Daubreé regards it as a result of hot spring action on Roman coins, but these waters are not considered meteoric by Suess and other competent observers, and at any rate must be compared with the solutions making primary ores. If the tetrahedrite formed by them is to be regarded as secondary, it is a case of enrichment by ascending alkaline waters. The term secondary as used by me is understood to mean the result of oxidation and leaching of vein material by meteoric waters, with the emigration and redeposition of metallic substances by reaction on lean ores in the underlying part of the vein. The occurrence noted by Dana is also capable of similar interpretation, as indeed are similar associations of chalcopyrite and enargite at Butte, Montana, where careful observations with numerous assays and analyses show that the ores were deposited by ascending waters. I feel, however, a debt of grat-

itude to Mr. Bancroft and his critics for the personal observations contributed to the present discussion, and if my interpretations differ from those advanced the facts themselves are indisputable. It seems, however, that the cavities referred to as showing dissolution of stibnite, while they make it possible for some secondary ore to be formed, really add to the evidence against the secondary origin of the ore shoots and indicate that stibnite is a primary mineral. In the specimens I have examined stibnite occurs in beautiful, needle-like crystals, and also as a massive mineral associated with sylvanite and other tellurides, notably a telluride of lead as well as with gray copper. This association appears to me to indicate a primary origin, since the interlocking of the minerals show them to be of simultaneous deposition.

A similar ore occurs at several mines in the gold belt of the Blue Mountains of Oregon, where it has been examined by Lindgren,[1] who says it is not a secondary concentration, but bears all the ear-marks of original deposition. I have observed gray copper in the deep levels (2,300 feet) of the Elkhorn mine, Montana, where it was undoubtedly an original ore. Gray copper also occurs in the Drumlummon lode and in numerous other veins in Montana, which have been examined by the writer with a special view to the determination of its original character, and it is also a common mineral in many of the rich silver-copper veins seen by the writer in Sonora, Mexico.

Emmons has called attention to the hypothesis of enrichment by ascending solutions. This theory, advanced by me in my original paper on enrichment in 1900, is supported by further observation, and I have attempted to show the probable reaction in a recent paper, an abstract of which has already appeared in this journal. The ascending waters carrying alkaline carbonates together with metallic salts react with pyrite of earlier deposition, forming glance and other sulphides. The reaction is $2\ FeS_2 + 6\ CuO + H_2O = 3\ Cu_2S + Fe_2O_3 + H_2SO_4$. This actually takes place in laboratory experiments.

Walter Harvey Weed.

Washington, D. C., March 28, 1903.

ACCIDENTS DUE TO COMBUSTION WITHIN AIR COMPRESSORS.

To the Editor:

Sir.—In his paper prepared for the American Institute of Mining Engineers, and published in your issue of March 28, Dr. Ledoux gives an interesting account of a serious accident which might occur in almost any common mining plant, provided due precautions are not observed. In the first place, it is very likely, though not stated, that the air compressor in question was not a compound machine; that is, the air was not compressed in stages. This is the first point to consider when equipping a mine with an air compressor, and where the purchaser wishes to be insured against a similar occurrence. By compressing the air in stages, that is, by the use of compound cylinders, the maximum temperature during compression is very much reduced and the liability to "flaming" is less. Having an air compressor with compound cylinders, the next thing to do is to provide a high grade of oil to be used in the cylinders. This should be an oil with a high flashing point and of a non-coking nature. In other words, when the oil is placed on a shovel and held over a fire there should be little or no carbon deposit left after it has been volatilized. The third point to be observed is to caution the engineer not to use much oil in the air cylinders. A drop every five minutes is sufficient in a cylinder of ordinary size, and every engineer should feed soapsuds into his cylinders for at least one day in the week in order to wash away any deposit which may have accumulated through the use of oil which has been acted upon by high temperatures in air. These soapsuds may be fed through the regular oil cup. Care should be taken not to let the machine lie idle with soapsuds remaining in it; that is, shortly before quitting time the feeding of soapsuds should be stopped and oil feeding substituted.

[1] *Twenty-first Annual Report*, United States Geological Survey, p. 609.

Another point is that every engineer should look into his discharge valves, air-receiver and other places where deposits are liable to accumulate, and keep them clean. A discharge valve which sticks, either through defective construction or through the accumulation of carbon around it, is liable to admit hot compressed air from the receiver back into the cylinder to increase the temperature of the air before compression to so high a point that it is quite possible to reach the flashing point of the oil. In connection with this, it is well, also, to bear in mind that the intake air should come from the outside and not from the inside of the engine room. This is important, because a cold intake gives a higher volumetric efficiency to the compressor and also because it results in a lower maximum temperature during compression, which not only means safety against "flaming," but economy of power. The hotter the air is during compression the greater is the resistance to compression. Another reason for an outside intake is that bad air in the engine room, or smoke or fumes from a fire, will not be sucked into the compressor and discharged into the mine.

This case also illustrates the value of intercoolers and aftercoolers in a compressed-air plant. These coolers are surface condensers, the intercooler being placed between the high and low-pressure air cylinders and serving to reduce the temperature between the two stages of compression. The aftercooler reduces the temperature after the last stage and condenses and collects all such foreign matter as oil, moisture, dust, etc., sending pure, dry air down into the mine.

W. L. Saunders.

New York, April 4, 1903.

SECONDARY ENRICHMENT.

To the Editor:

Sir.—For some time I have been reading the various articles on the genesis of ore-bodies, and of late in your Journal, under the head of "Discussion" the letters concerning "Secondary Enrichment."

I have lately met with an instance of what I take to be a rare case of secondary enrichment which may be of interest. It is generally believed by mining men that *surface* enrichment of a gold vein is caused by the oxidizing effects of vadose waters decomposing and leaching the bases, such as sulphides, pyrites, etc., and leaving the gold contents behind. Occasionally, however, the gold itself is dissolved, and precipitated at another point in the vein. To such a case I wish to call your attention.

When I was given charge of the property to be described, a drift had been driven about 400 ft. upon a seam of manganese oxide (psilomelane) from 1 to 4 ins. in width, carrying values from a trace of gold to a dollar or two per ton. Ahead of this drift the country is capped by a formation, locally termed slate, but whatever it may be, it is *not* slate; it looks as if while in a plastic condition it had been subjected to great pressure, thereby producing a cleavage, resembling that of slate. When this drift reached a point directly under the edge of this "slate" cap, the seam of manganese oxide opened to a width of from 3 to 6 ft., and upon one side (foot-wall) there was from 12 to 18 ins. of hard, solid white quartz, running $40 per ton in gold. I wish to lay particular stress upon the fact that only in this one part of the mine, so far as I know, is this quartz solid, and evidently undisturbed since its deposition. This gold-bearing quartz ore is of average density and weight. In all other parts of the mine (when I last saw it, the shaft had reached a depth of 250 ft.), the vein is filled with the same material, but the conditions are quite different, as the quartz ore is much broken, of low specific gravity, and the interstices filled with manganese oxide. Wherever these conditions obtain, this broken and fractured quartz carries no gold value beyond traces; but upon one wall, and sometimes on both walls, there is an entirely different lively looking quartz containing gold. I think I state a fact generally, when I say that every linear yard stoped in this mine, so far as opened, produces the same amount of gold; in other words, a square yard of a 4-in. pay-streak yields as much gold as where the pay is 4 ft. wide.

Now, Mr. Editor, I think I quote your own words, "solvents for gold in nature are exceedingly scarce, but of precipitants there are no end." It is well known that manganese oxide with sulphuric acid and salt, produce chlorine, one of the very best and strongest solvents for gold. In this mine the manganese oxide is present in large quantities, the decomposition of the sulphides would produce the sulphuric acid, and the sodium chloride is present in the surface waters of to-day.

The gold in this mine is exceedingly fine, so much so that contact with a cyanide solution for fourteen hours gave an extraction of 95 per cent in several tests made by me, and I will say here that the plant installed since I left the mine extracts a fraction over 96 per cent of the value.

My reason for calling attention to the fineness of the gold is because the fact is well known to chemists that a sudden and prompt precipitation of the contents of a solution causes an extreme fineness of the precipitate. No better precipitant for chloride of gold is known than iron sulphate. The decomposition of the pyrite yielded the sulphuric acid, the iron sulphate was left behind as a by-product, consequently the solution carrying the gold dropped its auriferous contents when it came in contact with the iron sulphate. As further proof of the precipitation of the gold, I will cite the fact that on the 200-ft. level, where another vein comes in, or goes out, on the strike of the vein, and where the vein-filling is 7 ft. wide, the fissure is entirely filled with broken wall-rock which runs $20 per ton. The interior of any of these pieces of wall-rock contain little if any gold, whereas any of them will show gold on the outside.

As proof of the actual presence of chlorine, I cite the fact that in the thinnest and richest deposits on the wall, there are streaks of a bright green substance, sometimes a quarter of an inch in thickness which give a strong re-action for chlorine. What is it?

Another thing to which I desire to call the attention of those interested in the subject under discussion is the fact that the barren quartz vein-filling is extremely light and porous, the vugs or cavities being filled with manganese oxide. Silica was evidently extracted in great quantities at the time when the gold was purloined. Any alkaline carbonate will dissolve silica; but what was the precipitant?

Again, on the lower, or 200-ft. level, the west drift was run 150 ft. through this same broken leached quartz before the ore on the walls was encountered. What became of the gold contents where the vein is barren? Is it not reasonable to expect a zone of enrichment below? What part, if any, does this "slate" cap play in the matter? In other places in the mine the fissure is nearly filled with a heavy spar, I take it to be sulphate of lime; wherever this occurs there is invariably a rich streak of ore on both walls; was this a precipitant for the gold?

Charles Taylor.

Nogales, Ariz., March 25, 1903.

PETROLEUM MONOPOLY IN FRANCE.—The proposal to make the sale of petroleum and petroleum products in France a government monopoly, which was passed by the Chamber of Deputies, has been defeated by the Senate, and the Government will, it is understood, withdraw the proposition.

AMERICAN ENGINEERS IN POLAND.—The Warsaw *Press* reports that six American engineers—whose names are not given—have been visiting mine operations in Russian Poland. They made their headquarters in Warsaw and made trips from thence to the Dombrova coal-fields and to the coal mines of the Donetz District; and, at the date of the report, they had just started for the Urals.

THE SAMPLING AND ESTIMATION OF ORE IN A MINE.—VII.

BY T. A. RICKARD.

(*Continued from page 515.*)

INFERENCES FROM SAMPLING.

When the sampling has been thoroughly done the engineer is in possession of many important facts. If he is a novice he will have learned the assay-value of the ore at each of the spots he has sampled and he will have learned little else.

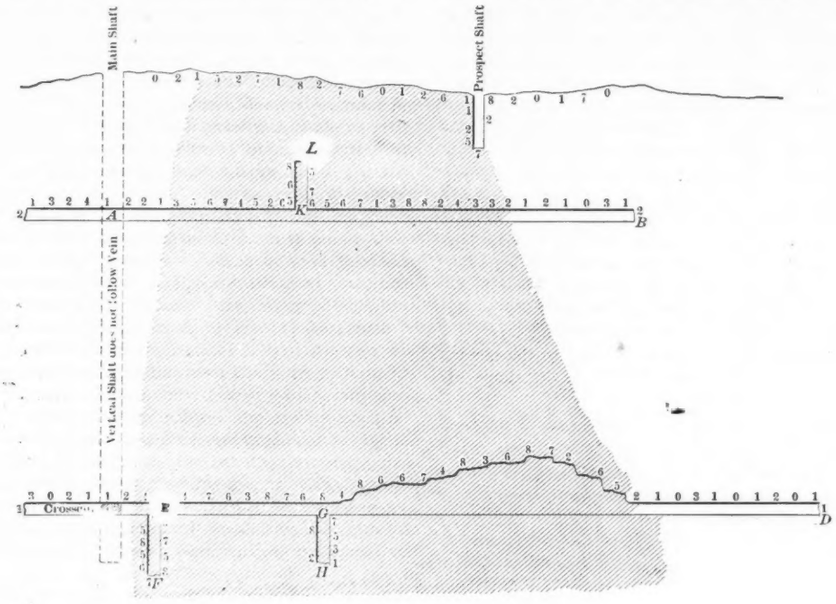


FIG. D.

Nothing illustrates so well the proverb that "a little knowledge is a dangerous thing," as the direct inferences from the results of sampling. To emphasize this statement, I will take an instance which is founded on fact. In Fig. D you have a longitudinal section of a small mine, which has been apparently well opened up. The shaft is vertical and does not follow the vein, which inclines to the west. The levels to the north have found nothing, those to the south (A B and C D) have cut through ore which is also explored by a raise (K L), and two winzes (E F and G H). At the lower levels, stopes have been started and the backs make an excellent showing, as the figures indicate. The latter are not expressed in any particular unit, but it is to be supposed that O means barren, 2½ means pay-ore and so on, up to 8, which marks rich ore. The results are indicated on the section. The inference, as to the amount of ore in the mine, is exhibited by the cross-hatching.

In arriving at this estimate the novice is guided by his sampling alone; he has failed to take note of the geological features. It may happen that the superintendent of the mine, an old practical miner, we will suppose, has told him that the ore is fairly uniform within the limits of the shoot and that while the rock does indeed vary a little in places, this variation does not seem to affect the general distribution of values. Or, again, it may be, as happens often, that the man in charge of the mine is honest, but not honorable, and, instead of committing himself to such statements as the foregoing, he keeps discreetly silent, or, under cover of appearing to refrain from influencing our young engineer,[1] he absents himself while the sampling is in progress, and leaves his shift-boss or some other underling to do the talking. Perhaps, indeed, those in charge of the mine really do not appreciate the true condition of affairs, and the engineer is deceived by an oversight which will appear almost excusable. However, the mischief is done, the mine is taken over by a financial syndicate or a mining company. Before the business is actually consummated, another engineer, representing another financial interest, is sent out to make an examination. We will suppose that this man is of greater experience than the last; he is, moreover, familiar with the geological structure of this particular district or of another similar to it. He proceeds to sample. The accuracy of the previous sampling is confirmed, but in the course of his investigation he has noticed that the country is not uniform, and that there are two different rocks exposed by the workings. One is obviously granite, the other he cannot label accurately without a microscopic section, but it is evidently an eruptive which has intruded into the granite; so, on account of its speckled appearance, he applies the term "porphyry" to it, and when the sampling is finished he spends a few days in carefully examining the workings with a view to getting an idea of the structural relations between these two rocks. The results are set down graphically and he obtains the information illustrated in Fig. E. By examining this section, side by side with Fig. D, it will be seen that his inferences are warranted. The consequences are surprising. He discovers that there is no continuous ore-shoot from the surface downward, but that there are two comparatively small lenticular ore-bodies which occur where the vein cuts through the porphyry sheets, and only in those portions of the porphyry where certain cross-veins have exercised an enriching effect. When the vein gets into granite it becomes poor, and, moreover, it pinches, a fact which the sampling did not sufficiently emphasize. The ore-reserves are cut down to a fraction of the previous estimate, and the future prospects of the mine are considered most uncertain, because the ore already found is due to local structural conditions which are unlikely to recur.

Another kind of error may be instanced. It is more frequent in placer mining than in the estimation of ore in lodes. Fig. F represents the cross-section of a deposit of tin gravel in an old river channel now capped with basalt. The deposit was sampled through shafts which cut right down to the "gutter," 180 ft. deep, below the basalt. In this sampling the gravel was taken all the way down the shafts and mined together, so that each shaft yielded one large sample. From the weight of this and that of the resulting grains of tin, after panning down, the percentage was calculated. The estimate of quantity was based upon the length of channel, within the boundaries of the property, multiplied into an inverted triangle, A B C, the base of which was the top width of the deposit and the apex the "gutter." The cubic yards, thus obtained, gave an approximately correct result as to quantity of material, but the estimated average content was all wrong, because the method of calculation disregarded the fact that the richest stuff was concentrated at the lowest end of

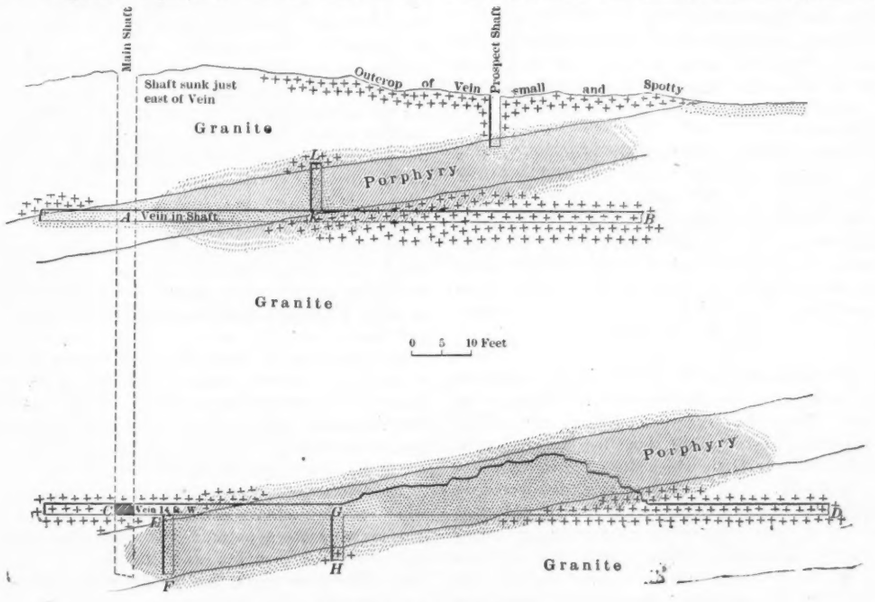


FIG. E.

[1] I have supposed the blunder to be due to youthful inexperience, for this is the least blameable, but as a matter of fact, blunders of this kind are due to ignorance and are frequently made by older men of the kind described as "thoroughly practical" where the particular emphasis on "practical" is indicative of utter lack of training or such technical education as an engineer requires.

the triangle, and actually formed a very small proportion, in weight, of the whole. Subsequently, the ground was re-sampled. The total depth of 180 ft. was, in the case of each shaft, subdivided into sections of 30 ft., except the last 30, which was further divided into two portions, one of 20 ft., and a lowest of all, only 10 ft. thick. The first 30 ft. was found to be almost barren, the next 30 ft. assayed 0.2 per cent of tin, the next 30 ft. 0.28 per cent, and so on, increasing gradually until the last 10 ft. was reached. This was very rich, 1.5 per cent, on account of concentration in the "gutter" or bed of the channel. Each layer was calculated separately as to quantity and average contents, giving results which proved the bottom to be very profitable, but difficult to work on account of want of gradient for hydraulicking operations; while the uppermost portions of the deposit were found to be too poor for profit, but yet requiring handling in order to get at the lower-lying part of the gravel.

The method first described would have given a very much exaggerated idea of the cubic yardage and a false notion of a uniformity of value, besides ignoring the working difficulties to be encountered in the extraction of the tin from the successively deeper layers of the gravel. This is very much like the sampling of a vein in a prospect shaft where the samples are taken every 10 ft. and are allowed to fall to the bottom where they mingle confusedly and eventually form a "large sample," the weight of which is mistakenly supposed to give assurance of the accuracy of the average deduced from the subsequent assay.

It is not necessary to cite other instances of this kind. Happily, they are rare. The real work of good judgment usually commences in the estimation of future prospects. Mines are very rarely bought merely for the ore proved up by complete evidence; the attractive feature is, as a rule, a speculative enhancement of value likely to arise from further discovery. This is where the trouble begins.

(*To be Continued.*)

A JAPANESE IRON MINE.—The Kamaishi Mine is situated in the province of Rikuchu in Japan. The deposits are scattered on the eastern and western sides of a hill about five miles west of Kamaishi Harbor, with which the mine is connected by a tramway. The mine was first discovered in 1823, and operations were begun in 1848. It was owned by various proprietors, and was finally bought by the Government in 1874. Some improvements were introduced under the direction of English engineers, but the results were so poor that work was stopped. The mine was afterwards sold to Ichibei Tanaka, who has since worked it successfully. It is now the principal iron mine in Japan. The ore consists entirely of magnetite, and is found in large scattered masses. The principal one has a thickness varying from 20 to 70 ft. There are outcrops of iron ore in other localities in the neighborhood, none of which have been worked to any extent. The blast-furnace operated in connection with this mine turned out 13,683 metric tons of pig iron in 1900, and it is still in operation.

THE GEOLOGIST IN MATTERS OF PRACTICAL MINING.

By J. E. Spurr.

Mining geology is a study of the natural laws which govern ore-deposits. Every miner, mine foreman, superintendent, even promoter and owner, is a mining geologist, to the best of his ability. And along with a natural tendency to catastrophic theories, to invoking agencies like floods, glaciers, earthquakes, and volcanic outbursts (in which there is a faithful reproduction of the mind-workings of the most advanced geologists, not very many decades ago), there is a good deal of sound geology to be learned from those who come into close and constant contact with natural phenomena. Among these unschooled geologists I hold in highest esteem the mine foreman, who is not sufficiently read to be biased by half-learned theories, and has enough breadth of mind to be able to change it occasionally.

I would therefore lay it down as a principle that without geology mining would be very nearly impossible. Without it the barbarian may dig a trench on the surface, to remove the valuable minerals he has found out-cropping, but such an operation would hardly be classed under the term mining.

The first question that presents itself to the miner, starting to work in a new district, is the shape of the ore-body he is about to exploit,—whether it is a vein, a blanket deposit, or an irregular mass. From an inspection of the outcrop and of surface test-pits, he reasons this point out, and lays his plans and sinks his shafts accordingly. In the case of a vein, the dip comes prominently into his calculations. The shaft is usually sunk to a depth which, according to the miner's geological conclusions, will be favorable, and a cross-cut is run, to strike the vein at a point where his geology has convinced him it will be. When he has struck the vein and finds it of lower value than he expected, he drifts along to catch a shoot. This involves a foreknowledge and experience of geological principles, which has taught him that in veins the ores are likely to be richest along certain zones.

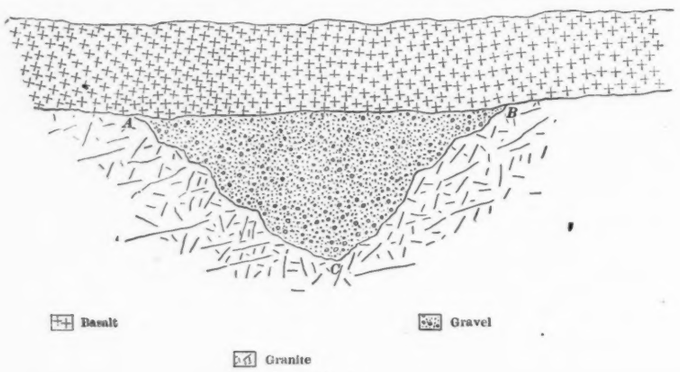


FIG. F.

One might go on with this illustration indefinitely, to show that the valuable knowledge of the principles governing rocks and ores, which is sought after, acquired and used by the miner, is precisely that which the professional mining geologist must attain and know how to apply.

The next popular question which comes up is whether, after all, the professional mining geologist can perceive these natural laws and their application any better than the practical miner, or even as well. The professional has usually more training in accurate deduction, more reading, and a more varied though superficial experience with ore-deposits, the miner has the advantage of an intimate personal acquaintance with the rocks and ores in question, and has endless opportunity of testing in practice the value of whatever theory he may form.

It often strikes one as a curious fact that there is a popular impression to the effect that miners know more about ore-deposits than geologists. Once on starting out on a geological expedition, I fell in with a distinguished engineer and bridge-builder. He inquired why I did not take miners along with me, who knew all about mines and ores, and could explain them to me. I doubt whether he would have seen the point had I asked him why he did not get a skilled bridge-workman to draw up his plans for him.

In answering the question as to the relative reliability of miners and geologists in practical matters of mining, it would first be best to eliminate from the discussion nine-tenths of the geologists, and a corresponding proportion of mining men. There are a horde of "mining experts," that appropriate also the name of *geologist,* who comprise metallurgists, engineers, surveyors, assayers, promoters and fakirs. It would also be proper to except geologists of some merit and standing, whose attention has always been fully occupied by other branches than the study of ore-deposits, and who yet feel capable of jumping into this supposedly minor branch of the science, and solving problems offhand. Some of the greatest and most ignorant blunders have been made by this class. These various improperly prepared types of "geologists" are greatly in the majority, and yet cannot be easily and properly distinguished. There is no recognized test of advancement in the science, no college degree, no organization of which membership is a guarantee of proficiency. The field is free to all comers.

Among miners and mining men, I would except the ignorant and prejudiced class, incapable of reasoning directly upon any subject; also the confirmed theorists, who can explain by tremendous and startling processes all the phenomena observed in rocks and ores, and who force the facts to suit their theories even more unrelentingly than a half-trained geologist.

This accomplished, we have left a body of men of both classes, by whose joint work the science and its profitable application is steadily progressing.

In a previous paper, read before the Mining Congress at Butte, and subsequently published, I have given a number of detailed notes on various points where the researches which fall into the special field of the geologist are directly applicable to mining; I will not undertake to repeat or to amplify that sketch here, but will confine myself to a few general remarks.

It is the inevitable result of the co-operation between miner and geologist, above noted, that the latter should be somewhat ahead as regards geology, as the former is as regards mining. Hence it is one of the duties of the geologist to advise and instruct regarding many points.

One of the points is the theory so commonly held, that ore increases in depth. This is a tenacious idea, even in districts where all facts point to the contrary. Although the richest ores in a given region may all lie at the surface, the prospector whose outcrop is not all that it should be is usually convinced that he has only to get sufficient depth to find his ore "opening up and of high grade." "If we could get a shaft down a thousand feet." they will say, "there's where the vein would show up strong." In such districts it is common for prospecting shafts to go as deep as possible before cross-cutting to their vein, in this way increasing the time and expense of exploration, and often going far below the best ore. In a certain district, where the veins are vertical, a company sank a shaft 400 feet and cross-cut the rock (which was the true country rock of the veins) from side to side of their property, without finding a vein. They then proceeded to sink to a thousand feet, and there cross-cut again, confident that the veins would come in with depth.

Many such questions a skillful geologist should be able to approximately decide beforehand. There is no rule for increase or decrease of size, and values of veins with depth. The chances are perhaps in favor of growing impoverishment rather than growing richness. But each case has to be taken up and reasoned out separately. There may result the prediction of certain probable changes in the value and nature of the ores. Some gold-quartz veins will decrease greatly in value below the zone of oxidation; other gold-quartz veins, where the

climatic conditions are different, will hold their values down to great depths. Certain forms of copper deposits will change and cease to become profitable some distance below the water level. In gold-silver veins under certain conditions gold will increase in proportion going down, and under other conditions it will decrease. These examples might be greatly amplified.

Defunct tunnel companies, which started on nothing and ended in the same, are in many cases unheeded monuments to the falsity of the idea that veins will probably be found in depth, where there are no surface signs, even though the rock exposure may be excellent. Such companies start with the valiant determination of cross-cutting every vein in the country, and usually finish with a large dump.

A correct understanding of rock structure, of the nature and characteristics of stratified rocks and of igneous rocks, is absolutely necessary in serious prospecting works, or in mining. One must know how to calculate from the out-crop of a stratified rock its probable position at any given point underground. For this purpose a knowledge of faults and folds, and of the methods of plotting and computing their movements, must be possessed. It is equally necessary to understand that, save in an uncertain degree in the case of lavas, igneous rocks cannot be reckoned with in the same way as strata. Errors arising from ignorance of stratigraphy, and those arising from the application of its principles to igneous rocks, are perhaps equally common. In regard to the former, cases are frequent where the miner, seeking a known ore-bearing formation, either starts to sink at a wholly lower horizon, or at one so much higher that he can hardly succeed in reaching the desired point.

A recognition of the natural laws and irregularities of veins is also essential. I have in mind a place where a main vein is intersected by a branch, which runs into it and stops. Notwithstanding this fact, it is considered by many that the vein must be only temporarily interrupted and cannot definitely cease, and a deep shaft has been sunk some distance away to find this continuation.

One of the departments of the science that is in most need of cultivation is the study of faults, especially as applied to breaks in veins or ore-bodies. In some places this has been paid attention to, but in others it is not in the least understood. Many of those to whom a definite single slip plane would have some meaning, fail to comprehend a large fault, attended by a fault-zone which may be many feet across, and in which are fractures and slips in all directions. It is important to be able to seize upon the chief planes of displacement in all this disturbance, to judge of the direction of the displacement from the drag, the striae, and the minute slips which are auxiliary to the main break. Thus the direction in which the broken vein is to be sought may be determined, and in a short time a definite law of faulting for each particular locality may often be arrived at, so that, in case of a break, the probable direction, and very often the approximate amount of displacement, may be calculated, and exploration directed, even where there is no convincing direct evidence in the particular slip.

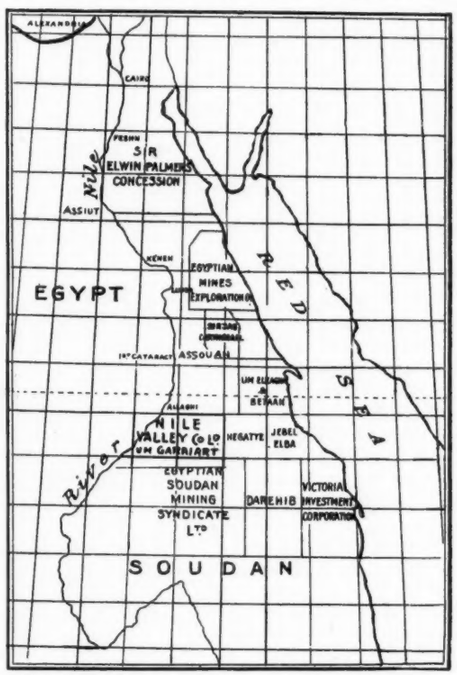
An exact knowledge of different kinds of rocks, their characteristics and properties, is also necessary, and, of course, only the geologist specially trained in this branch of the science can claim such proficiency. One of the popular geological mistakes of the miner is to attach too much importance to the *kind of rock*. By them some rocks are supposed to be ore-bearing, others not. A common conception of the work of the geologist is that it is his duty to "classify" formations as mineral-bearing or non-mineral-bearing. This, of course, is an error. As far as the kind of rock goes, one may use the old miner's phrase, "Gold is where you find it." But there are many specific cases where the determination of rocks *is* of value. I have in mind a mining district where the veins have formed in a certain volcanic rock. Later volcanic rocks of much the same appearance, the differences being distinguishable only to the eye of the specialist, have covered up the ore-bearing formation. Through lack of ability to distinguish one from the other a good deal of money has been spent unnecessarily in prospecting the younger rock.

A case with a slightly different moral occurred in a limestone country where there was a silver-bearing vein. The manager drove a tunnel to tap the vein at a certain point, where he expected to reach a contact of "quartzite" with the limestone contact, which was exposed at the surface. At this place he expected to find rich ore, though the vein in general was rather low grade. He was using *geology* in making these plans, but his knowledge was defective. In the first place, the "quartzite" was a band of jasperoid (silicified limestone); secondly, there was no reason why ore should have been especially rich at this contact, even had the rock been quartzite.

It would be possible to extend this discussion so as to cover many detailed points which arise every day in mining practice, and which are met by the miner with more or less wisdom. In so far as the best available knowledge is brought to bear on these problems, mining becomes direct instead of speculative.

EGYPTIAN GOLD MINES.

The sketch map which is published herewith illustrates the geographical position of the concessions which are now being made the basis of company promotion in London. The concessions cover enormous areas—for instance, the Soudan Mining Syndicate has rights over 20,000 square miles. If acreage meant ore, this would be magnificent indeed, but it really means a domain of arid desert covered here and there with the gopherings of a forgotten era; so that the extensive territory under control is valuable chiefly for the privilege of conducting widespread explorations.



SKETCH MAP, EGYPTIAN GOLD-FIELDS.

The following description of the Samut mining area, abstracted from a report recently made by Mr. Fred J. Donnal, superintendent of the Egypt and Soudan Mining Syndicate, will give a general idea of the conditions encountered in this region:

The physical features of this district are somewhat similar to those of Hamesh; the whole area consists of low rocky hills intersected by numerous watercourses; the latter are devoid of trees and vegetation of any kind, the absence of which gives the locality a most deserted and weird appearance.

The geological formation is chiefly dioritic and porphyritic rocks, the western boundary of which, about three miles distant from the mine, is marked by the immense belt or zone of Nubian sandstone extending westward to the Nile.

Several veins of quartz, of varying thickness and length, and showing unmistakable evidence of diligent and careful prospecting by the ancients, have been discovered within a radius of four miles from the principal vein.

On each side of, and adjacent to, the principal workings, a large area is covered with the ruined remains of what undoubtedly were once well-built habitations of the workers. In some cases they form a settlement of considerable magnitude, sufficient to accommodate a large number of men. A short distance southeast of the foregoing are representations of more dwellings scattered along the slope of the hills, singly and in groups of two or three, while in a small *wady* about one mile further west scores of similar huts, single and in blocks, may be counted along the sides of the *wady* for a distance of at least one mile.

As the latter contain a large number of well-worn rubbing-stones, it is assumed that the bulk of the ore from the workings was conveyed there to be pulverized, to enable them to extract the gold by washing, or by a process unknown to us, since no such stones, excepting a few hand-mills of the circular type lying at the second site, are to be seen at the other sites. Again, about one and a half miles south-southeast of the camp, another large ruin (about 260 by 190 ft.) and a number of huts, within easy distance of it, exist. This old settlement is termed by the Arabs a Roman station, which doubtless it was, since it is on the old caravan route from Edfu to Berenice.

The immense number of ruined huts, together with that of the ancient workings, which are more numerous and extensive than those at Hemesh, point to the conclusion that this was once a large and populous mining center.

It was considered probable that a "buried well" might be found within the above and last-named enclosure; consequently, two deep trenches were cut across the latter, with the view of finding it. The result proved fruitless; thereupon a pit was sunk to a depth of 69 ft., at which point a supply of excellent water, sufficient for present requirements, was struck. The discovery of this water so near the camp is of great value to us, as hitherto the daily supply was procured from a small well in Wady Sebreit, about 13 miles distant.

The subjoined table shows the average maximum and minimum temperature, together with the mean and range of same for each month (exclusive of the period from July 6 to September 15, 1902, when, unfortunately, it could not be taken, owing to the accidental breaking of the thermometer), from October 23, 1901, to January 31, 1903:

	Average Maximum.	Average Minimum.	Mean.	Range.
	Deg.	Deg.	Deg.	Deg.
October 23 to 31, 1901....	105	70	87.5	35
November, 1901	86.5	63	74.7	23.5
December, 1901	86.5	55	70.7	31.5
January, 1902	77.5	49	63	28.5
February, 1902	88.5	57	72.7	31.5
March, 1902	90	58	74	32
April, 1902	94.7	62	78.3	32.7
May, 1902	109	71	90	38
June, 1902	109	71	90	38
July (1 to 5) 1902	103.4	67.8	85.6	35.6
September (16 to 30) 1902.	110.2	77.6	93.9	32.6
October, 1902	101.7	68	84.8	33.7
November, 1902	93.5	56.5	75	37
December, 1902	81.7	48.7	65.2	33
January, 1903	79	46.7	62.8	32.3

The highest maximum temperature recorded was 115°, and the lowest minimum 32° Fahr.

The rainfall during the same period was most meager, rain having fallen on three occasions only, the total amount registered being 0.5 in.

It is therefore obvious that the supply of water obtainable from this source is far too small and precarious to be of any practical use in the development of the mines. It was at first thought impossible that an adequate supply of this commodity for the purposes of milling and cyanidation could be ever obtained locally. The striking of water in

the shafts at Hamesh and in the well at Samut, at the comparatively shallow depth of 70 ft. has, however, somewhat modified that opinion, and it would appear probable that a supply for such purposes could be procured by sinking a number of fairly deep shafts at favorable points. The capital outlay for sinking and equipping these shafts would necessarily be very heavy, and it may be premature to say whether or not it would be more advisable to adopt such a scheme in preference to that of treating the ore at the mill, as outlined in the former report, until the productive capacity of the present shafts has been tested at greater depths.

The principal vein at Samut can be traced by ancient workings and outcrops over a length of 3,000 ft. From the point where it is first seen, the vein has been worked (northwards) almost continuously for the first 1,000 ft. in the usual manner, viz., by an opencast along the outcrop. All the excavations, however, are nearly filled to the surface with drifted sand and debris that has fallen from the walls. Several samples were panned from the small dumps of quartz lying near the workings, and from the veins where exposed prior to commencing operations, and give results from a trace to 15 dwts. of gold per ton. Six samples were also sent to London for assay, and yielded from 1 dwt. to 11 dwts. of gold per ton. Three of the old workings on this vein have been partially cleared to date.

Since last July a considerable reduction has been effected in the transport rate, camel hire and cost of labor. The price now paid is as follows: Transport rate (from Daraou to the mines), 15 piastres per kantar (100 lb.), or $16.56 per ton. Camel hire, from Daraou and local, 45c. and 35c. per day, respectively; the former rate was 65c. per day. The cost of labor (that is, wage, cost of food and charges on same) is 40c. per day per man.

GOLD MINING IN SUMATRA.

During 1902 the Redjang Lebong mines, in Sumatra, produced 22,456 tons of quartz ore, of which 16,435 tons were treated, with a yield of 21,982 oz. gold and 118,225 oz. silver. The remaining 6,021 tons are reserved, in the form of slimes, for further treatment. In all, about 10,000 tons of slimes were produced during the year, but the slimes plant had to contend with many difficulties, and from the quantity remaining it is evident that it was unable to cope with the output. Two large Dehne filter-presses have been sent out and are now erected, and it is confidently expected that a much greater quantity of slimes will be treated during the current year. The number of stamps at work during 1902 averaged between 20 and 25, from January to August, inclusive; during September and October, however, owing to unprecedented drought and consequent want of water power, only about an average of 9 heads were kept going. For November, 25 were operated, and for December, 30. The mine possesses 40 stamps, and the full number is now at work.

The production for January 1903 was 2,634 oz. gold and 14,241 oz. silver, this being the highest output ever made by the mine. The neighboring company, the Mynbouw Maatschappij Lebong-Soelit, has been reconstructed under the name of the Mynbouw Maatschappij Ketahoen, and has just commenced crushing with 20 stamps.

THE CENTRAL ASIAN RAILROAD.—Negotiations are reported to be pending for the construction, by a private company, of the railroad which is to connect the Siberian line at Tomsk with the Trans-Caspian Railroad at Tashkent. A large part of the line can be built at a moderate cost. Surveys are now being made by the Government of two routes proposed, one following the upper tributaries of the Ob River and the other the Irtish. In either case some expensive work will be needed through the passes of the Altai; but the rest of the road will be easy to build. This line would touch some important mineral deposits.

SOME PERSONAL EXPERIENCE ON MATTING OF ORES AT LEADVILLE AND ROBINSON, COLO.

By C. H. Doolittle.*

In presenting these notes to the profession it is with the view of counteracting some ideas concerning capacity of furnace, upon which great stress has been laid during the past year in various articles appearing in the JOURNAL.

The writer has visited some of the works possessing furnaces with such large capacities, and he has been employed at both matting and lead smelting plants in this country and Mexico, so that he is frank enough to confess that no individual problem has been a harder one to solve than the one at Leadville, and its success was due in a great measure to its vice-president and general manager, the late Mr. Franklin Ballou. The two plants are now closed, the Bi-Metallic having been sold to the American Smelting and Refining Company, while the Robinson smelter is closed down, pending the further development of the mines. Leadville during the year 1900, the period to which these notes refer, was dull, with the market conditions such that suitable ores were difficult to obtain—copper sulphides very scarce and zincy iron sulphides predominating.

The tonnage of a furnace is due both to the physical and the chemical condition of the ores which are treated. The Leadvile ores are naturally fine, and, it would appear as if too much powder was used in mining, but the mine owner prefers to ship his ore in that condition, claiming that it helps accurate sampling. One-tenth sometimes, one-fifth more frequently, had to be crushed, rolled and sampled, and for a month at a time our flue-dust and slimes amounted to one-tenth of the total ore. It is likely that Mr. Herbert Lang must have had some experience of this kind, as he assumed that the Tennessee Copper Company was doing similar work, but very much to my surprise on a visit to that company's works, the writer could find but little flue-dust, and, in fact, they were making less than 0.5 per cent, as nearly as could be figured without actual weighing.

I would like at this point to contradict a statement frequently heard, that "anybody can run a copper matting furnace, but it takes a good man to run a lead furnace." I have had more sleepless nights over the former than the latter, and with a copper matting furnace with an ore column of 6 to 7 ft., and the ores as rich in silver and gold as the average lead smelter, and rustling hard to get 1.5 per cent of copper in the charge, the superintendent must be up early and late, and not sleep far from the furnace.

The Bi-Metallic plant was unique in several features and the system adopted was worked out after much hard labor and expense. The furnaces were three in number, having the dimensions, at the tuyeres, of 36 by 163 ins., 36 by 175 ins., and 36 by 215 ins. The first two were used for concentrating the ore into a low-grade matte, the third and largest one for reconcentrating the matte with the addition of oxidized siliceous ores. The air was furnished cold by three No. 7 Root blowers, and so connected to the furnaces that each furnace could have its individual blower, or they could be turned into the general main and the blast drawn and subdivided for the various furnaces. The individual arrangement was found preferable. Two fans, one 9 ft. and one 6 ft. diameter, were connected with the dust chamber; the gases, after having traveled 300 ft., were forced through towers, where they were sprayed, and a large part of the fume, rich in lead and silver, was precipitated and saved. The gases then escaping were damp and reduced to a temperature of 100° F., which necessitated a wooden stack. The power was furnished by a Corliss engine developing, by card measurement, 450 horse-power as its maximum load.

Having, by experience, found the capacity of the various furnaces for ore and matte, we endeavored to so run the furnaces that the matte produced by the ore furnaces was just sufficient for the reconcentration furnace, and the slag from the reconcentration furnace, which had to be re-smelted, was not too burdensome for the ore furnaces, but still sufficient for keeping an open charge in the ore furnaces. We thus endeavored to keep our capital out of large surpluses of low matte and high slag.

The characteristic ores treated are given in the following table:

Name of Mine.	SiO_2	Fe	CaO	Zn	Cu (Wet).
Iron Silver	3.	41.	0.	6.	.1
Ibex M. Co.	20.	28.	0.	6.	2.7
New Monarch	28.	18.	0.	11.	3.5
Marian	8.	38.	0.	1.	.5
Vinnie	23.	23.	0.	9.	3.
Commodore	85.	3.	2.	0.	0.
Centennial-Eureka	77.	5.	2.	2.	6.

During the month of March, 1900, the three furnaces ran 31 days each, and there was treated 9,838 tons of ore carrying 2,256 oz. Au, 159,811 oz. Ag, 314,690 lbs. Cu. This shows an average for the three furnaces of 105.8 tons of ore per furnace per day. The matte shipped averaged 2.249 oz. Au, 146 oz. Ag, 14.328 per cent copper. The recovery, 98.5 per cent Au, 95 per cent Ag, 90 per cent Cu.

A charge for the ore furnace consisted of:

	Lb.
Ore (all sulphides)	2,600
Limerock	250
Bricked flue-dust	300
Slag	1,500
Coke	325
Total	4,975

This shows a consumption of fuel of 12.5 per cent on the ore, but such was not really the case, as the works were supplied with a method of submerging the coke in water, and it carried 20 per cent moisture; hence the actual percentage of coke was 10 per cent.

The flue-dust was bricked and fed in sufficient quantities to keep that objectionable material (and necessarily a large one at this point) from accumulating. The slag specified above came from the reconcentration furnace, and was fed to keep this stock low and the charge open. Under ordinary conditions the ore furnaces averaged 120 tons of ore each. Great care had to be used in feeding the furnace, on account of the fine ore and the heating qualities due to the sulphur. A charge for the concentrating furnace consisted of:

	Lb.
Matte	1,000
Siliceous ore	600
Limerock	100
Wet coke	125
Total	1,825

This shows a consumption of fuel (dry) of 16 2-3 per cent. Taking the whole number of tons of ore treated for the month of March, 9,838, and the actual amount of fuel consumed, 1,417 tons, gives a fuel consumption per ton of ore of 14.4 per cent., which is a proper average for a year, as well as for this month.

The capacity of this furnace, for ore, was 75 tons per day. The average slag was 36 per cent SiO_2, 36 Fe, 7 CaO, 5 Zn. A little higher saving might have been made by the addition of more lime and using less iron, but from a commercial standpoint, lime cost us money, and a $9 rate, on a neutral basis, on iron ore, left a good margin for treating that class of ore. The average cost for the month showed $3.645 per ton of ore treated, including all expenses, except new construction. The matte was shipped to the Philadelphia Smelting and Refining Company, at Pueblo, and treated for $3.25 (freight and treatment), allowing us $19.25 per oz. for Au, 95 per cent of the Ag, 4c. off casting brand quotation for copper.

The Robinson Construction, Mining and Smelting Company had but one stack, though a second one is on the ground ready for erection. This is a 36 by 142-inch Loder hot-blast furnace. The hot blast consists simply of a series of pipes carrying the air in a chamber through which the escaping gases from the furnace pass on their way to the dust chamber. The blast is warmed and the highest temperature obtained from numerous tests was 200° F., but even this is not to be despised if it can be ob-

* Late Superintendent of the Bi-Metallic Smelter, at Leadville, Colo., and the Robinson Construction Mining & Smelting Co., at Robinson, Colo.

tained without unnecessary use of over feeding fuel. During the times of reconcentration the furnace was always run with a cool top to avoid losses in precious metals; then the blast temperature would drop to about 90° F. The conditions at this plant were more favorable to smooth running than at Leadville. We mined our own ores and limerock, hence we were able to keep the physical condition of the ores such that slag was not a necessity to keep the charge open.

The chemical conditions were different, in that copper appeared in the ores we mined only as traces and but a small amount of copper ore was obtainable on the market, and this ran but 4 per cent Cu, so our collector was practically an iron matte; but we made a good saving, which was due partly to the copper and more to a heavy fall of matte. The specific gravity of the slag was lightened by a higher percentage of lime than at Leadville. The market condition for the sale of matte had changed. There was no competition, and but one purchaser for our matte. The price paid was $9.45 freight and treatment, 95 per cent of the Ag, $19 per ounce Au, 6c. off New York quotation for Cu. This condition necessitated a high concentration, of 30 into 1 as a final shipping matte. This was, of course, accomplished by re-concentration. The ores treated are given in the following table:

Name of Mine.	SiO_2	Fe	CaO	Cu
Washington	5.	42.	0.	Tr.
Robinson	25.	15.	1.	Tr.
Pride	64.	12.	3.	4.
Wintergreen	4.	48.	0.	1.

The iron was all a sulphide, FeS_2, except that from the Wintergreen, which was a pyrrhotite, Fe_7S_8.

The writer had been told by other metallurgists to beware of pyrrhotite in a raw state, but we experienced no difficulty with it, and as it carried 1 per cent of copper, we preferred to use it. A 24-hour run on ore used:

	Tons.
Washington	7.60
Robinson	81.00
Wintergreen	36.98
Total ore	125.58
Lime-rock	25.65
Slag	55.50
Total charge	206.73
Coke	16.50
Per cent fuel on ore	13.14

Slag assay and analysis showed:

Ag	1.1 oz.
SiO_2	41. %
FeO	30.8 %
MnO	5.5 %
CaO	17. %
ZnO	4. %
	98.3

Re-smelting matte:

Ag	42.07 oz.
Cu	0.2 %

A 24-hour run on re-concentration:

	Tons.
Robinson	116.50
Pride	28.42
Total ore	144.92
Matte	121.52
Lime-rock	21.90
Tons of charge	288.34
Coke	14.60
Per cent fuel on ore	10.

Matte:

Ag	200 oz.
Au	0.5 oz.
Cu	5. %

The average percentage of fuel used during the time the smelter was in operation was 13.5, being about 1 per cent less than the fuel consumption at Leadville. After smelting 3,289 tons of ore it was deemed best to close the works and make a clean-up. The flue-dust made was 2½ per cent on the ore treated. The cost of fuel and labor was $2 per ton of ore. Labor in this case does not include management, superintendence, etc.

The results, shown by the data given above, will undoubtedly seem small in tonnage to the copper metallurgist, but the ores are similar to those handled by lead metallurgists and the tonnage fully equals that of the 42 by 146-in. lead furnace with a 20-ft. ore column and a 3-lb. blast.

All of the above enumerated ores carried some lead and zinc, and notwithstanding the volatilization of the major part of the lead, the resultant matte carried about 3 per cent of lead.

MINING METHODS ON THE KLONDIKE.*

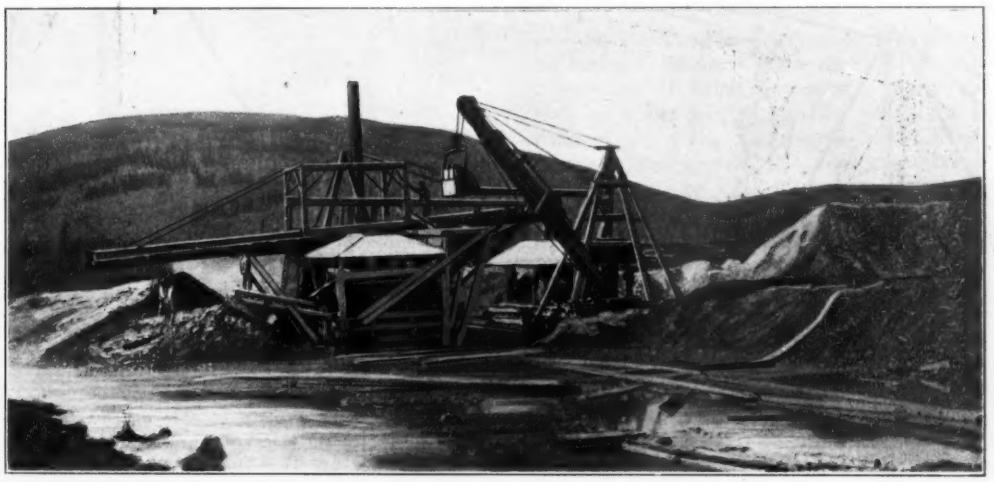
By Eugene Haanel.

The methods at present employed on the Klondike in reaching the "pay-streak," which underlies an overburden of muck and barren gravel, depend, aside from the requisite supply of water, mainly upon two conditions, namely, the inclination of the ground to be worked and the depth at which the "pay" is found.

If the overburden is inconsiderable, the claim is worked by "open-cut"; the pay-gravel is laid bare the overburden being removed by "stripping" the entire area to be worked. If the ground is approximately level, the stripping is effected by the use of scrapers, operated by horses or steam power, steam points for thawing being employed when necessary. If the inclination of the ground permits, and the available supply of water is sufficient for the purpose, the overburden is removed by ground-sluicing, that is, by washing away the muck and barren gravel by means of a jet of water under pressure. The pay-gravel is by these methods exposed to the action of the sun, which thaws the gravel, permitting its removal to the sluice-box by pick, shovel and barrow, or the operation of a steam shovel or by "ground sluicing" into sumps and subsequent elevation by machinery. Illustrations of these methods with particulars will be given later.

Where the overburden is very thick and the fall of the creek bottom insufficient for ground-sluicing, as at Gold Run, the cost of removal of barren material by above described method is prohibitive and the pay-streak must be reached by shafts and drifts. The breaking down of the frozen gravel in drifting is accomplished either by steam-thawing or ground-sluicing; the latter process being employed where the gravel is coarse and interspersed with large boulders, preventing the entrance to any depth of the steam points, or where steam-thawing would bring down too large a quantity of gravel at a time or result in the premature caving in of the roof or walls of the drift.

If the ground to be worked has sufficient inclination and water of sufficient quantity and under sufficient pressure is available, hydraulicking is the method employed in removing the barren material and extracting the gold from the underlying "pay-streak." A powerful stream of water washes away the overburden, disintegrates the barren and paying gravel, which, with the exception of large boulders, is carried by the force of the water along improvised channels into the sluice-box.[1]



STEAM SHOVEL PLANT IN OPERATION ON DOMINION CREEK, YUKON.

MACHINERY AND APPLIANCES USED IN THE OPEN-CUT METHOD.

Steam Shovel Plant of Dougherty and Stiles, on Dominion Creek.—The claim which is being worked by this interesting plant has been stripped by ground-sluicing. The amount of water used for that purpose ranges from 100 to 200 miners' inches. The overburden averages only 5 ft., the depth of gravel to be worked, 10 ft. The bed-rock has not been reached as yet. Very few boulders are encountered, and the gravel is not frozen.

The operations are conducted with two machines; one being the steam shovel proper, the other the gravel-dressing plant. The steam shovel is built on the plan of a common dredge, the contents of bucket-shovel being dumped by releasing the catch which holds the swing-bottom in place when being filled, elevated and swung over to be emptied. The release is operated by the engineer operating the shovel. To enable the shovel to tear up the bed-rock, when reached, the lip of the bucket-shovel is armed with three strong prongs of steel. The bucket-shovel is capable of effectively excavating gravel 10 ft. below the level of the machine. The bucket-shovel holds about three-fourths of a cubic yard, and the machine has a capacity of 800 cub. yds. in two shifts of 10 hours each.

The gravel-dressing machine is composed of a hopper into which the steam shovel dumps the gravel, which is there attacked by two streams of water under pressure, which disintegrate and wash it into a rotating trommel. The trommel is 40 ins. in diameter, and perforated with holes of ⅝ and ⅞ in. in diameter. A spiral ledge, 4 ins. high and about 12 ins. between spirals, keeps the tailings tumbling long enough to be thoroughly washed by the jets of water which proceed under a head of 27 ft. of pressure from a perforated pipe passing through the center of the trommel. The over-size tailings fall upon a belt conveyor, which can be lengthened, shortened and inclined, as necessity requires, and thus find their way to the dump. The under-size gravel, carrying the gold and the wash-water, passes into a box beneath the trommel, from which it is elevated by a centrifugal pump into the head of a sluice-box, which is connected by gates with two separate sluice-ways, provided with Hungarian riffles, one sluice-way being used when the other is being cleaned up, so that no stoppage of operations is required during the time occupied by the clean-up.

The steam-shovel absorbs 10 h.p., and the gravel-dresser 8 h.p. The plant is said to have cost $20,000, and with the exception of some castings, which were imported, was designed and constructed at Dawson. The working force consists at present of 20 men, 10 men for each shift of 10 hours. The capacity of the plant is equal to the work of 90 men per shift of 10 hours.

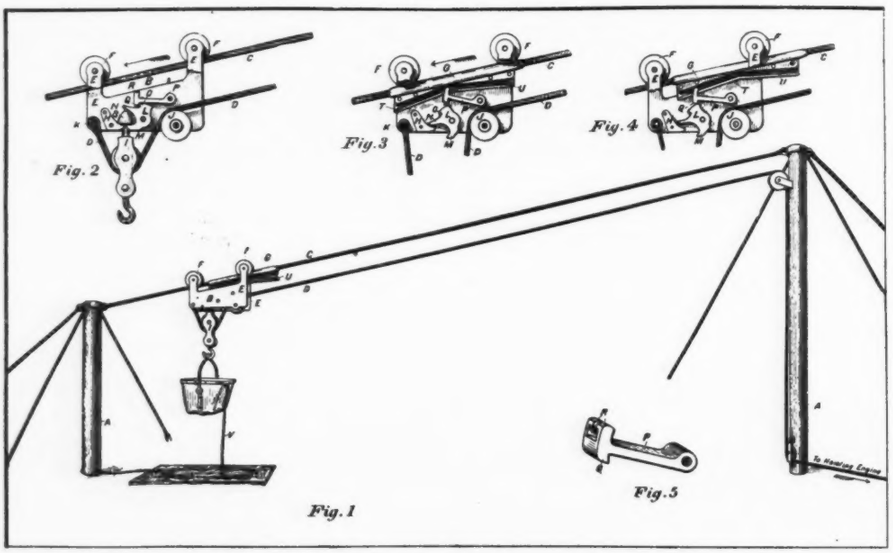
The quality of the ground worked is low grade, and according to the manager's report, carries $1.50

* Dominion Superintendent of Mines. Abstract from *Report for* 1902. Department of the Interior, Ottawa, 1903.

[1] In both "ground sluicing" and "hydraulicking" a jet of water under pressure is the agent employed for disintegrating gravels. The term "ground sluicing" is used by miners of the region when the gravel loosened and moved by the jet of water requires a second handling to bring it into the sluice box; "hydraulicking" is the word employed when the same jet which disintegrates and moves the gravel also forces it into the sluice boxes.

per cubic yard of pay-gravel. Under the favorable conditions which prevail at this claim, much lower grade gravel could be handled with profit. The cost of operation is reported as 13c. per cubic yard handled. This low cost is accounted for in part by the exceptional cheapness of the fuel in this special locality. There is plenty of wood near at hand costing $4 per cord, laid down at the claim.

The plant just described furnishes an excellent illustration of the method to be pursued in working profitably gravel which could be worked only at a loss by the ordinary placer methods. This will be seen from the following figures: 4.5 cub. yds. of compact gravel is about the average amount a man can shovel from a dump into a sluice box in a shift of 10 hours, for which he receives $7.50, the ordinary wage at these mines. This is at the rate of $1.66 per cubic yard, exclusive of the expense for labor in bringing the gravel to the dump at the sluice box.



YUKON SELF-DUMPING CARRIER, PATTERN NO. 1.

A steam-shovel is also in operation on claim No. 2, Eldorado, which is being worked for the second time. The shovel here is used to pick up indiscriminately what was left from the first working, including tailings, stripping and virgin pillars, and putting this material direct through the sluice-box.

Dredge Operating on Bonanza Creek.—The following description of this dredge offers nothing specially new in construction, and is given merely to complete the record of machinery used in working by the open-cut method.

The dredge is provided with two endless chains of buckets, 29 buckets for each chain, occupying respectively the front and rear of the structure. The chain of buckets situated at the front or bow performs the function of excavator and hoist, the other that of tailings-stacker. The lips of the buckets of the former are armed with strong prongs of nickel steel, those of the latter are plain. A 75 h.p. boiler furnishes the steam power, 65 h.p. being required to operate the plant.

The excavating buckets elevate and empty the gravel into a rotating perforated trommel, the axis of which is inclined about 10°. The gravel, tumbled by the rotation of the drum, is washed by jets of water, from a perforated pipe, which passes along the axis of the trommel. The over-size falls into the buckets of the tailings-elevator and the fine gravel, carrying the gold, passes along with the wash-water over tables situated on either side of the trommel. These tables are provided for the purpose of catching the gold with mats, overlaid by expanded metal, which performs the function of riffles. The gold which is not caught on the mats falls with the tailings into sluice-boxes situated below these tables.

The "clean-up" is effected every morning. The mats are shaken over a pan placed in a large box, and panned in the usual manner. The fine gold, which cannot be thus recovered, falls into the box, from which it is transferred to amalgamators and run over amalgamated plates. The sluice-boxes are cleaned up in the usual way.

Three men for one shift are required to run the dredge, which handles, on an average, 700 cub. yds. of gravel in a run of 20 hours; this represents the labor of 156 men working with a shovel and pick. The consumption of fuel is 3.1 cords of wood per day at a cost of $12 per cord. The men receive $5 per day and board.

The depth of water needed to float the dredge is 4 ft. Where the ground is not frozen, the whole depth of the claim is taken up without moving the dredge; where it is frozen, the unfrozen top is taken up, down to the frost, the remainder is taken up later, when thawed by the sun.

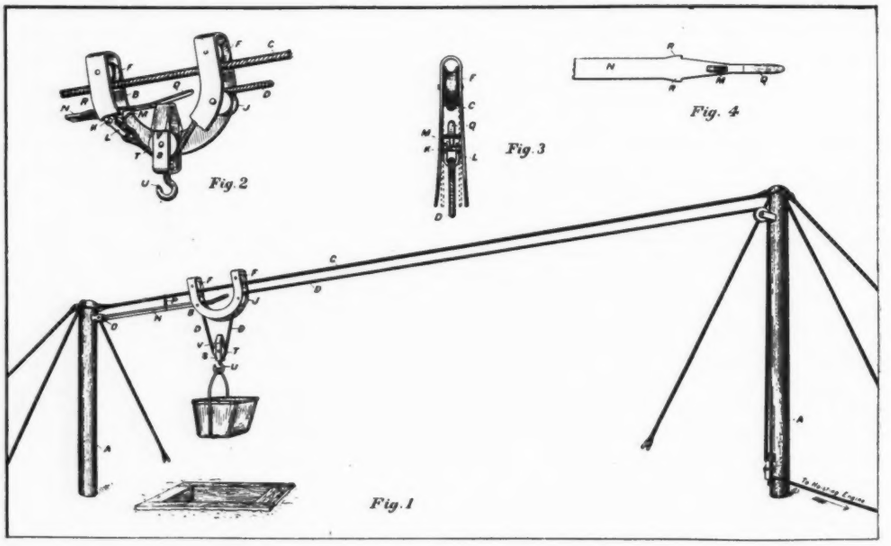
Open-Cut Worked by Ground Sluicing and Bucket Elevator.—Claim 17, on Eldorado Creek, is being reworked by ground-sluicing. The gravel is disintegrated and washed down into a sump by a jet of water from a 2-in. nozzle, under a head of 35 ft. From the sump the gravel is elevated 30 ft. and dumped into the sluice-box by means of a bucket-chain elevator. Part of the water used for sluicing is elevated by pump from the sump in which the water from the ground-sluicing collects; 25 h.p. is absorbed by the pump, and 12 h.p. by the bucket-conveyor, requiring three cords of wood in 24 hours for steam making; 15 men are at present employed, which will be reduced to 8 next year, 4 men for each shift of 10 hours. The conveyor does the work of about 62 men, as regards the quantity of gravel moved, without taking into consideration the work required in lifting the gravel some 30 ft.

This method of re-working ground by open-cut is very effective; the gravel readily yields to the force of the jet, and is easily washed into the sump.

Centrifugal Pump in Open-Cut at the Mouth of Gold Bottom.—The sluicing on this claim is done at the bottom of the open-cut. The head of the sluice-box in this case is provided with a grizzly, preventing boulders and large size gravel from passing down into the sluice-way. The over-size is forked out into wheelbarrows and deposited in the worked-out portion of the cut. The fine tailings and sluice-water pass into a sump, into which dips the intake of a centrifugal pump, which forces the fine tailings and water through an iron pipe back into the creek.

METHOD OF SHAFT AND DRIFT.

The improvements made in the machinery required for bringing the pay-gravel from the drifts to the sluice-box on the surface consist in the replacement of the windlass by steam-hoists and the introduction of self-dumpers. These latter labor-saving devices are of special interest in that they represent an invention made in the Klondike and credited to one Bernard Esby. There are now a number of patterns in use, but all operate on the same principle, which consists in running a trolley, carrying a bucket, up an incline wire-rope, tightly stretched between shaft and sluice-box, to the head of the sluice-box, where on account of the tightening of a rope attached to the underside of the lip of the bucket, the bucket is capsized, discharging its contents into the sluice-box. On slackening the hauling rope, the bucket is righted, and the trolley returns by gravity along the wire-rope to the mouth of the shaft. Arrived here, the trolley is locked, the pulley to which the bucket is attached is released and descends by gravity to the bottom of the shaft. On hoisting, the tightening of the hauling rope, when bucket has arrived on top of shaft, unlocks the trolley, but locks the pulley holding the load to the car, and the trolley now proceeds, as before described, up the incline to discharge its load automatically at the end of its journey.



YUKON SELF-DUMPING CARRIER, PATTERN NO. 2.

The foreman of the McDonald Iron Works at Dawson was kind enough to furnish rough sketches of two of the most commonly used patterns. The accompanying drawings, based on these sketches, illustrating the operations of these self-dumpers, and

showing the functions of the different parts in the critical positions of the trolley, were made by Mr. William J. Graham.

Description of Self-Dumper, Pattern No. 1.—Similar letters of reference indicate similar parts throughout.

Fig. 1 represents a parallel perspective view, showing the general arrangement throughout. The trolley with load in position for its journey along the cable to point of discharge. Fig. 2 represents an enlarged detail view of trolley car inside elevation, with outer plate of car removed to show the interior mechanism. Fig. 3 illustrates the position of interior parts of trolley car, when in position for releasing the bucket to descend the shaft. Fig. 4 illustrates the position of interior parts, when locking the trolley, preventing its farther descent. Fig. 5 represents a detail perspective view of the retaining hook, showing the slot which fits the incline on the cable.

The posts A, strongly guyed, are placed one near the shaft and the other just beyond the point of discharge. The incline of the standing rope C is such that the car will, on slackening the hauling rope D, run by gravity freely from discharge position back to position over shaft and with sufficient momentum to engage the trolley locking device P U. Q of P is lifted out of recess of cam L (shown engaged in Fig. 2) throwing cam L over from position in Fig. 2 to that in Figs. 3 and 4, allowing head S of pulley block I to slip from the jaws of cam L and stationary iron piece H. This releases the pulley block with attached bucket, which is now free to descend. During release the locking bar P has slid along the incline U from position shown in Fig. 3 to that shown in Fig. 4; Q of locking bar P being now in contact with head of cam L, trolley is prevented from further descent.

On hoisting bucket from shaft, trolley car, being in position shown by Fig. 4, moves up the standing rope until R of lock-bar P, arrives at U and remains locked in this position until head S of pulley block I, passing into gap between H and L and striking the prolongation N of cam L, throws L over, so that jaw M engages beneath head S, while Q of P locks into recess on cam L (as shown in Fig. 2), permitting R of P to lower sufficiently to allow trolley to slip from incline U in the direction of discharge. In this position pulley block is locked and trolley with its load, on further hoist, travels along incline to point over sluice-box. Meanwhile dumping rope V is stretched taut, and on further hoisting capsizes the bucket, dumping its load. At this instant, observed by the engineer at the hoist, power is shut off and the hoist reversed; the bucket assumes its vertical position and the car follows the slack of hoist rope D to position shown in Fig. 1.

The engineer is signaled from shaft when the bucket requires to be hoisted, but his position in the engine house is such that he observes for himself when power is to be shut off and engine reversed after dumping of load. This pattern works well with loads up to one ton.

Description of Self-Dumper, Pattern No. 2.—This mechanical device, illustrated by accompanying drawing, is even more ingenious than the one just described, in that the operations are performed by fewer parts and of such simple construction that, with the exception of the pulley and the two rollers of the trolley, the remainder can easily be constructed by any good blacksmith.

As before, similar letters refer to similar parts.

Fig. 1 represents a parallel perspective view, showing the general arrangement throughout, and the bucket in the act of either ascent or descent. Fig. 2 represents an enlarged angular perspective detail view of trolley car on standing rope, with bucket removed and pulley block in position for carrying the load. Fig. 3 represents a vertical transverse section of the car near its center, and shows the limbs of the frame of the car in the spread position in which the bucket is released to descend the shaft. Fig. 4 represents a detailed plan of the underside of the locking bar at its front end.

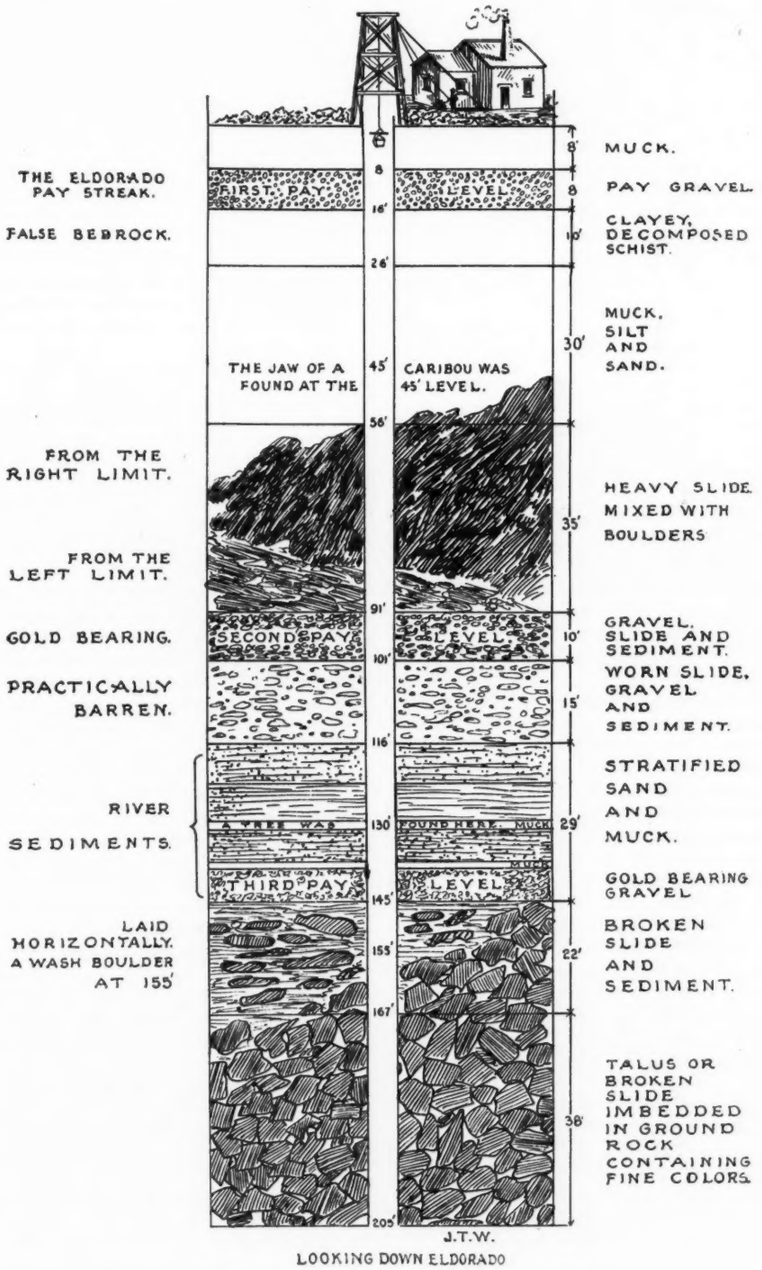
The frame of the car B consists primarily of an elliptic or steel outline, which is afterwards, as shown in Figs. 1, 2 and 3, bent with a round turn parallel to the minor axis. The turn is of such width that sufficient space is left between the two semi-elliptic sides to accommodate the rollers F. The roller J, over which the hauling rope is carried, is located beneath the standing rope C; on the opposite side of the frame a pin K serves as a support for clevice L, to which the hauling rope is permanently attached. There is sufficient space between the eyes of clevice L to permit catch M of locking bar N to pass over pin K, engaging the pin K, on slackening hoist rope D, when in position shown by Fig. 2.

The locking bar N consists of a flat iron bar jointed at O to post A, and secured by chain P (as shown in Fig. 1) so as to hang at the proper distance from standing rope C, to permit catch M fully to engage pin K.

Part Q of the bar N is inclined upward. The bar itself widens gradually from its outer extremity to the points R where stops are situated (as shown in Fig. 4) which prevent the trolley car from descending further on the incline of the standing rope C. This widening portion acts as a wedge to spread the car frame, as shown in Fig. 3, and also as a brake to ease the blow on the stops at R.

The pulley block S, carrying the roller T, consists of an iron frame, wedge-shaped at its upper end, and the lower end furnished with hook for the support of the bucket. The wedge-shaped portion acts as a guide between the limbs of the car-frame and at the same time provides the catch ledges N, which rest on the upper edges of the lower parts of the limbs of the car, when the frame springs back to its original position, thus supporting firmly the block with its load upon the car. The capsizing rope, on under side of lip of bucket, is not shown.

Operation: Assume the bucket with its load (see Fig. 1) in position of ascent. On hoisting, the wedge-shaped part of pulley block S, entering between the limbs of frame of car, strikes the part Q of lock-bar N, which disengages the catch M from pin K, releasing the car B. On further hoist, the car in its onward movement along standing rope



SECTION ON ELDORADO CREEK, YUKON TERRITORY.

C slips gradually from the inclined sides of lock-bar N; the limbs of the frame of car approach each other until the catch ledges V rest securely upon the upper edges of the lower part of the limbs of the frame. Any further hoist moves the car with its load along the standing rope C to the point of discharge.

On return by gravity, having arrived over shaft, upper part of frame of pulley block S slides along incline Q of lock-bar N, lifting catch M above pin K, at the same time wedge-shaped part of lock-bar N opens limbs of frame of trolley to allow pulley-block, on further slackening, to pass between them and the bucket descends the shaft. As the top of pulley frame leaves the lock-bar N, the lock-bar descends and catch M engages pin K, locking the car in position over shaft.

Observations were made regarding the efficiency of self-dumper, pattern No. 1, on Discovery Claim, Lower Dominion Creek. By counting the number of buckets raised in a given time it was found that, on an average, 300 buckets could be raised from the shaft, which in this case was 46 ft. in depth, and dumped in sluice-box in a shift of 10 hours, on the supposition that a loaded bucket was always ready at the bottom of the shaft to be exchanged for the empty bucket arriving.

THE NEED OF TESTING GROUND BY PANNING WHEN DRIFTING.

In taking out gravel by drifting, it is necessary, to avoid passing from the pay-streak and mining barren gravel, that the ground be continually tested by panning as the drift advances. Neglect of this precaution leads frequently to disaster. An illustration cited by the mining inspector for the Gold Run District, is that of the case of an operator who worked a claim all last winter, taking out gravel, which he supposed to be pay. On sluicing in the spring, it was found that most of his dump consisted of barren gravel. The claim passed into other hands, and by panning and keeping within the pay-streak the present operators found the claim a profitable venture.

A still more telling illustration is given by the mining inspector of the Dominion Creek mining district. The owner of a claim worked all last winter with three steam plants, employing 21 men, accumulating on the dumps large quantities of gravel. No panning was done during the winter's work. On washing up the gravel in the spring, most of it proved to be barren. The new owners, by careful panning, kept within the pay-streak, and were able by three weeks' work to pay the purchase price of the claim, $2,500.

THE WITWATERSRAND GOLD-FIELD.*

By Hennen Jennings.

Without imagination and hope, the mining man can never make progress, but he must use these with moderation and go step by step.

It was necessary for the conscientious engineers who first came on the Rand to educate first themselves, then their principals. As the belief in the magnitude and permanence of the deposit increased, so justification for greater and greater expenditure became apparent. The education of the engineer in this regard was far easier and more rapid than that of his principals; but in justice to the latter it must be said that the final education of the mine owner, as to the wisdom and necessity of opening his purse wide for large and improved methods of work, is here greater and more complete than in any other gold-field of the world.

Work on the Witwatersrand was started in 1886, just about the time of the boom in the Barberton district. The nature of the deposit lent itself to easy and excessive activity in prospecting. By mere inspection no reliable idea of the value of the ore is possible. The first mill tests were made on the best ore that could be found at the surface, and these gave sensational results. It was soon possible to trace the banket formation for some 40 miles. Picked hand specimens of banket were very hard to distinguish from one portion of the 40 miles to the other. There was no other way of determining the value of the relative portions except by pan, assay and practical work.

Pannings and assays have a certain value in skilled and cautious hands, but in ignorant and sanguine ones they give very dangerous results. It is only by dealing fairly and carefully with many samples, making proper discounts for thickness of reef, recovery, etc., and applying the law of averages, that useful and reliable information can be obtained from small samples and assays. In almost any section it was practicable to obtain isolated promising pannings or assays from some parts of some of the ore-beds. It was only by time and the stamp-mill that the legitimate limitations of the pay areas have in any way been arrived at. And even yet this is by no means determined, as the extent of the conglomerate beds is immense, and the gold contents most variable. It is thus seen that the final extent to which they will be worked will depend on the amount of ore that can be treated at a profit. The lower the working expenses the greater this amount will be, and this, in a way, will lower the average yield.

The natural advantages and disadvantages of the Witwatersrand Fields can be summarized as follows:

Advantages—

Great extent of deposit.

Certainty of moderate yield on an average over large areas.

Close proximity to extensive coal-fields.

Healthful climate.

Small amount of water in the mines, but an average rainfall of nearly 30 ins.

Small increase in temperature due to depth, tests of the increment up to date showing only 1° F. for 208 ft.

Comparatively small amount of timber required in the development and exploitation of the ore.

Disadvantages—

The extensive faulting and dislocation of the conglomerate beds.

The thinness of the pay seams in certain sections, necessitating the mining of non-payable rock and a system of sorting.

The association in very fine particles of the gold with the matrix in such a way as to render concentration devices ineffective.

The unfavorable average dip of the beds (30°) for cheap exploitation.

Distance from coast in connection with altitude and course of supplies.

Sparseness of population per square mile, with the proportion of 1 white to 5 natives.

It has been seen that the results of past workings of these conglomerate beds have shown a return of about $10 per ton from a generous sample of 33,000,000 tons.

It has been estimated that on an average it must have cost the companies at the rate of about $25,000 per stamp for development work, and all capital outlay connected with their mines. There have been about 6,000 stamps crushing at one time on these fields, which would make the total capital outlay for producing companies figure at about $150,000,000. This makes no allowance for non-producing companies, or for the great outlays in Johannesburg in connection with central administrative control. A check on this estimate is shown by tabulated statistics, in which the capital expenditure for 68 companies is given, and it is seen that on a stamp basis this works out at $24,055.

These statistics further show that some 120 companies have been formed with a nominal capital of about $285,000,000, and that their market valuation at the end of December, 1902, stood at about $865,000,000; also, that in the equipment and development of some 111 companies, about $185,000,000 had been spent; that 71 companies had erected some 6,560 stamps; that only 47 of these companies had as yet paid dividends; and that the total dividends paid up to date amounted to nearly $97,500,000; thus showing that, altogether, some $87,500,000 more have been put into the gold mining business as betterments than have as yet been taken out in dividends.

The records show that the gold obtained from the Transvaal from 1884 to October, 1902, amounted to about $475,000,000, of which the mines designated as Main Reef produced $415,000,000, or about 88 per cent, and that 34 other companies of the Witwatersrand fields produced some $15,000,000, thus leaving only about $45,000,000 for other sources in the Transvaal. The total dividends from the fields outside the Witwatersrand from their commencement up to date equal about $10,000,000.

In the analysis of the 79 Main Reef companies from their start, to October, 1899, it is seen that these companies crushed 33,828,692 tons of ore, produced $33,296,000 of gold ($10.03 per ton), and distributed in dividends $86,229,000. Subtracting dividends from yield, it is found that the costs on this basis average $7.50 per ton, and that 25 per cent of the gold won has been distributed in profits.

The companies in the Central Section, with lateral extent on the strike of 12½ miles, have produced 76 per cent of the gold won, and 88 per cent of the dividends declared. The classification of the mines according to grade is also a most vital and interesting feature, and is shown as hereunder:

No. of Companies.	Tons Crushed.	Yield per Ton.	Dividends per Ton.
13	2,155,702	under $12.00	$0.09
12	3,378,559	under 14.40	0.18
12	7,792,868	under 16.80	1.89
11	6,327,879	under 19.20	1.80
19	8,894,363	over 19.20	2.69
12	5,279,321	over 24.00	6.68
79	33,828,692		$1.55

Another feature to which attention must be drawn is that of Deep Level Companies. A deep level company is a company holding ground to the dip or in the deeper horizons of an ore deposit, the outcrop area of which is held by other parties or corporations. The distance from the outcrop of the reef to the beginning of the deep level company is entirely dependent on the width of ground taken up by the outcrop company, and is not defined or limited by law. Some deep level companies have been formed where the distance from the outcrop to their northern boundary has been less than 400 ft., and others several thousand feet. Further deep level companies have been formed to the dip of previously formed deep level companies, and are then known as the second row of deeps; and, again, companies exist to the dip of these, and are known as the third row, and so on.

On these fields some 53 deep level companies have been formed, of which 14 have reached the producing stage. Some 81 deep level shafts have been sunk in the aggregate 88,405 ft.; of these 50 have intersected the reef.

The various financial houses controlling the mines estimate a further expenditure of $252,000,000 in connection with deep levels and other projected developments.

The greatest depth from which ore is now being extracted is at the Robinson Deep, where stopes are worked at a vertical depth of 2,400 ft.; the reef at this depth has all the normal characteristics observed in outcrop mines. The ultimate depth to which mining will be conducted on these fields is dependent on the grade of ore met with, and the working costs, the latter being influenced by labor and supply conditions, depth of hoisting, and the temperature and water encountered as depth is attained. At present the outlook for the last two of these factors of working costs is most favorable, and engineers on these fields are now discussing mining as possible at depths of from 6,000 to 12,000 ft.

* Abstract of Presidential address delivered before the Institution of Mining and Metallurgy, London.

THE USE OF BASIC SLAG FOR MANURE.—The Verein der Thomasphosphatfabriken has offered prizes amounting to a total of 40,000 marks to encourage investigation into the increase of fertility of soils by the action of bacteria, under the influence of mineral manures, with special reference to manuring with basic slag. The competition is to be open to all nations, but papers submitted must be written in German. The address of the Association is Hafenplatz, 4, Berlin, Germany.

LEAD SMELTING OF ZINC GOLD SLIMES.

The paper on this subject by Mr. P. S. Tavener, which was read at a recent meeting of the Chemical and Metallurgical Society of South Africa, and was republished in abstract in our issue of January 31, received an extensive discussion at the meetings of the Society, December 20, 1902, and January 24, 1903, the details of which have been published in the *Journal* of the Chemical and Metallurgical Society of South Africa for December, 1902, and January, 1903. The general tone of the discussion was highly favorable to the new process, which appears to be considered an important improvement in the art of extracting gold by the cyanide process as practiced in South Africa, and one that promises not only to reduce the cost of converting the gold precipitate into bullion, but also presents strong indications of the possibility of increasing the percentage of gold recovery by eliminating a certain loss which has heretofore been experienced in the treatment of the precipitate, and has not been fully appreciated. The extent of this loss and the precise manner in which it is suffered, have not been thoroughly determined; the increased recovery that may be expected from the new method is also still somewhat uncertain. These matters will promptly receive the attention of some of the skillful metallurgists who are members of the Chemical and Metallurgical Society.

Mr. C. H. Pead criticised Mr. Tavener's estimates as to the saving in cost of smelting, stating that over a recent period of seven months at three mills on the Rand the average cost for smelting (exclusive of labor) was only 5.36c. per ounce of fine gold obtained, as against 5.674c. per ounce of fine gold as reported by Mr. Tavener as the cost for four months smelting at the works of the Bonanza Gold Mining Company. Mr. Pead also stated that the cost of the acid treatment over a long period had averaged him 5.14c. per fine ounce, which added to 5.36c. per fine ounce, as above mentioned, made a total of 10.50c. per fine ounce for the whole operation instead of 25c., as stated by Mr. Tavener. It was brought out, however, in the subsequent discussion that Mr. Pead's figures represented the treatment of high-grade precipitate, and not that obtained from the leaching of ore slime, the treatment of which is quite a different matter.

Mr. Hans Meyer, who was intimately connected with the original trials of Mr. Tavener's process, contributed some additional information as to the methods employed, showing that the results had been carefully obtained. He remarked that in smelting on the Crown Deep with a "green furnace and rather too short chimney, the slags had averaged 6 ounces per ton, but had been as high as 17 oz. The 17-oz. slag, together with a large bulk of white precipitate from slime boxes, ground pots, sweepings, etc., had been smelted together, the slag resulting from this operation containing 1 oz. 17 dwt. 12 gr. per ton, and a large quantity of lead reduced through the agency of the ground plumbago pots. The possibility of an accumulation of such slag containing 5 oz. of gold per ton, together with lead, suggested that before long a Pilz furnace would be erected in which they could be smelted with the reduction of the poor lead bullion for conversion into litharge and use in subsequent smelts."

Mr. John R. Williams, president of the Society, described briefly the manner in which the tests of the Tavener process had been made. The slimes from the clean up were taken in a somewhat damp state, so that there would be no dust, and were passed through a comparatively fine screen. This operation was repeated several times after which the lot was quarter-sectioned in the ordinary way, the two portions from the first quartering being again subjected to the same operation. The first experiment gave such astounding results as to increased recovery of gold that it was regarded with suspicion. In the second experiment, instead of using Mr. Tavener's process, new crucibles were employed throughout, so that it would be impossible to get contamination from the bed of the reverberatory furnace. The smelting with litharge in plumbago crucibles is not a favorable way of carrying out the Tavener process, but even by it the most careful experiments resulted in 4.01 per cent more gold being obtained. In another experiment made at the Crown Deep a lot of slimes was divided most carefully into two portions. Each was treated with acid in separate vessels. One was smelted without any calcination. The other was heated to a dull redness in iron trays. There was a difference of 3 per cent in favor of the experiment wherein the smelting had been done without calcination. Another experiment which was made at the Jumpers' Deep, where the chemists were ignorant of the result of the first one, showed a difference of 2.98 per cent. Experiments which were then made at the Geldenhuis Deep showed that 2 to 3 per cent more gold was obtained by non-calcination than by calcination. Mr. Williams is evidently of the opinion that the increased recovery of gold by the Tavener process is due to the elimination of heretofore unsuspected losses in the calcination of the precipitate after the acid treatment. The necessity for calcination is the fact that on account of the use of a large quantity of lead acetate in the slimes plants of many of the mines, and the zinc being transformed afterward to the sand boxes, a very heavy matte is formed which is very rich in gold. If reduced with three or four times its weight of litharge it still carries up to 1 to 3 per cent of gold. Therefore, non-calcination in the case of acid treatment is impossible. Mr. Williams further stated that the cost of the Tavener process is certainly only about one-seventh of what the actual cost of smelting the bullion has been on the average mines of the Rand.

Mr. P. S. Tavener, in replying to the discussion of his paper, stated that in his experience on the Bonanza the percentage of fine zinc in the ordinary precipitate is not too much to be dealt with satisfactorily. All of the zinc is apparently completely oxidized, none being observed burning off when the charge is melting. It is possible that with reduction in the price of sulphuric acid it may still be advisable to subject the precipitate to a preliminary acid treatment, but this will in no way detract from the advantage of the new process for the subsequent smelting. The cupelation of the lead bullion is an easy and successful operation when suitable bone ash is employed for making a cupel; but with impure and unsuitable bone ash the results will be unsatisfactory.

ESTIMATION OF CYANIDE.*

By ALFRED ADAIR.

The silver method for the estimation of cyanide is not trustworthy in the presence of impurities, and even extensive adulteration might not be detected. The method to be described was originally devised for the estimation of ferro-cyanide in pot-metal (a very impure product). It can be readily adapted for the estimation of cyanogen in commercial cyanide, and is preferable to the silver methods for this purpose, because, although not quite so quick, only the useful cyanide is estimated. Cyanates, sulpho-cyanides, sulphides and chlorides, even in large percentages, do not sensibly affect the result.

The outline of the method is to convert the cyanide as such into ferro-cyanide—next to oxidize with $KMnO_4$, in the presence of H_2SO_4. The ferro-cyanide is oxidized to ferri-cyanide only, whereas cyanates, sulpho-cyanides and other impurities are either distinctively oxidized or converted into substances which do not interfere with the final steps of reducing the ferri-cyanide to ferro-cyanide, and the titration of the latter with $KMnO_4$ in acid solution.

Estimations can be made in 15 minutes, and concordant results are obtained in different operators' hands.

* Abstracted from the *Journal* of the Chemical and Metallurgical Society of S. A., January, 1903.

The solutions required are:

25 per cent caustic alkali.

20 per cent H_2SO_4 pure.

Saturated solution of $KMnO_4$ } approximate

Saturated solution of $FeSO_4$ } strength only.

$\frac{N}{10}$ $KMnO_4$. 1 c.c. = .156 grammes total Cy.

or more convenient strength, 1 c.c. = .100 total Cy.

The solution is standardized with $K_4FeCy_6 + 3$ Aq. 3 grammes are dissolved in 300 c.c. H_2O and 15 c.c. of the 20 per cent acid are added.

$$\frac{880 \times 3}{157.9 \times \text{c.c. consumed}} = \text{Value Cy in grammes per c.c.}$$

Method.—Ten grammes of the cyanide are weighed into a liter flask and about 200 c.c. water used to dissolve it, add 2 c.c. of the alkali solution and a quantity of the $FeSO_4$ solution equal to 12 grammes $FeSO_4 + 7$ Aq. add the latter 5 c.c. at a time and shake well.

$$6\ KCy \text{ and } FeSO_4 + \text{alkali} = K_4FeCy_6 + K_2SO_4 + \text{alkali}.$$

The reaction is immediate. Add H_2SO_4 and prussian blue is formed. Then 15 c.c. H_2SO_4 and saturated solution of permanganate until the color remains persistent, the color can be seen through the edges. 1 or 2 c.c. or more in excess does not matter. The above quantity of acid is enough for each gramme of $KMnO_4$ added, but if more than 1 gramme $KMnO_4$ is used acid must be added in the same proportion, viz.: 15 c.c. to each gramme of $KMnO_4$ used. If much sulpho-cyanide is present, allow to stand 15 minutes, and if necessary, a further addition of $KMnO_4$ may be required. The reaction is:

$$5\ K_4FeCy_6 + 4\ H_2SO_4 + KMnO_4 = 5\ K_3FeCy_6 + 3\ K_2SO_4 + KMnSO_4 + 4\ Aq.$$

Next add $FeSO_4$ solution in quantity equal to 15 grammes and immediately 15 c.cs. alkali solution. The solution must be strongly alkaline. Shake thoroughly and make up to the mark, again mixing thoroughly

$$K_3FeCy_6 + FeSO_4 + 3\ KOH = K_4FeCy_6 + Fe(OH)_3 + K_2SO_4.$$

this is the simplest possibility, but it may be

$$2\ K_3FeCy_6 + 3\ FeSO_4 = Fe'''_3Fe_2Cy_6 + 3\ K_2SO_4$$

$$Fe_3Fe_2Cy_{12} + 8\ KHO = 2\ K_4FeCy_6 \times Fe_3O_4\ 4\ OH_2$$

Filter through a large folded filter. The titration is completed by taking 500 c.c. or an aliquot portion adding 20 c.c. H_2SO_4 and adding the standard $KMnO_4$.

The influence of the precipitate on the results is small. It may be ascertained by testing a weighed portion of pure $K_4FeCy_6 + 3$ Aq. adding the quantities of solutions as for an impure sample.

THE AGE OF THE HOMESTAKE LODE, SOUTH DAKOTA

By G. C. HEWETT.

For the past twenty-two years all published writings have attributed the gold in this lode to the Algonkian schists, except Prof. W. O. Crosby and Mr. F. C. Smith, and they wrote of the Cambrian (Potsdam) siliceous ores, and only incidentally referred to the Homestake.

The work of Prof. T. A. Jaggar, Jr., and Mr. N. H. Darton in the *Twenty-first Annual Report* of the United States Geological Survey, with a few observations by the writer, make it very probable that the gold originated long subsequent to the schists.

It is, of course, apparent to every miner that the profit won from the Homestake lode is due to its oxidized condition. That is, that the gold is amenable to amalgamation, but this has not been so apparent to many investors.

Prof. Carpenter recognized early that the rhyolite was usually auriferous, but carried no gold in the immediate vicinity of the ore-bodies, but he did not give weight to this in his conclusion that the gold was in the schists long previous to the eruptive. Prof. Crosby was convinced that the rhyolite was normally auriferous, and to it he attributes the gold

of the siliceous ores of Ruby Basin. It can probably be shown that the Homestake gold has the same source. Every assayer in the district has tried hundreds of samples of the rhyolite, and it is, as Crosby says, the universal opinion, that this eruptive is generally gold-bearing. About eighteen months ago a diamond drill hole from near the bed of Whitewood Creek, one-half mile north of Kirk Station, at an angle of 45°, with a southwest course, passed through two of the rhyolite dikes, at a depth of 500 to 600 ft. below water-level. Samples from these cores containing pyrite were found on assay to contain 40 to 60c., respectively, per ton, in gold. From the conclusions of Mr. Darton, it is possible that this district may have had a higher altitude at one time than at present, but it is not possible, from the topography, that the local water-level was ever any lower than it now is. Therefore, this pyrite is not likely to have been enriched by descending solutions, and the cores may be regarded as indicating the normal character of the rhyolite.

If the rhyolite be conceded to be auriferous, it is a much more probable source of the Homestake gold than the indefinite and unknown source given to it by Carpenter, Irving and O'Harra.

Mr. Jaggar has shown that the rhyolite laccolith, fed by these dikes, was of great extent and not less than 2,000 ft., and possibly 4,500 ft., in thickness; without setting bounds to it, it is apparent that it extended north and south from Custer Peak to Garden City, and, transversely, from Ruby Basin to Galena. The detached patches, the remnants left from erosion, prove this much. It will be recalled that this area includes by far the most valuable of the known mines of the northern hills. Some of those outside of the area can be shown, like the Portland, to be mineralized in connection with this same eruptive.

The oxidized condition of the Homestake is a separate problem, and the small catchment, or topographic basin, of Gold Run, with its steep and regular fall, compared with similar gulches to the north, induced a search for the other sources of oxidizing waters. One was found in Mr. Darton's work in the diagram, page 695, of the oscillation of the Southern Black Hills, above and below sea level. This shows that in Oligocene time, this altitude was slowly submerged.

If one starts from the reservoir south of Ellison shaft, and observes the bearing of the schistosity of the schists, they will be found to swing to the right or east, and have their greatest divergence between the gulch and the Old Abe shaft. Gradually the normal direction is recovered below the Missouri shaft.

A dike of the younger eruptive, called "grorudite" by Jaggar, may be observed coming to the Homestake lode above the graveyard, and this eruptive is known to occur in the Homestake mine. If it is supposed that a small laccolith of this eruptive is the cause of the twisting of the schistosity, we have in its heat and consequent movement of water a cause for the oxidation and concomitant free character of the gold. This supposition would account for the gold nuggets found on the eleventh level of the Golden Star shaft, or about at the level of Terraville and Deadwood gulches, where the lode crosses. It would be an explanation also of the southward pitch of the ore-shoots.

The supposed laccolith, by its shattering and deformation of the schist, offers an explanation of Gold Run, which topographically needs some other causes than ordinary erosion.

A bibliography of the district by Mr. C. D. Walcott is given in the *Transactions* American Institute Mining Engineers, Vol. XXVII, page 230, but to it should be added F. C. Smith, Vol. XXVI, page 485, and Vol. XXVII, page 404; J. D. Irving, Vol. XXXI, page 695; J. D. Irving, *Annals* New York Academy of Sciences, Vol. XII, No. 9, page 187; T. A. Jaggar, Jr., United States Geological Survey, *Twenty-first Annual Report*, Part III, and N. H. Dayton, Part IV; C. C. O'Harra, South Dakota School of Mines *Bulletin VI.*

RUSSIAN PETROLEUM PRODUCTION.

The interesting yearly report of Mr. James C. Chambers, United States Consul at Batum, Russia, gives the total production of the Baku oil-fields for the past year as follows, in barrels of 42 gals.:

	1901.	1902.	Changes.
Total production of wells	80,553,152	76,383,463	D. 4,169,689
Loss and used as fuel at wells	9,361,846	8,216,418	D. 1,145,428
Net production	71,191,306	68,167,045	D. 3,024,261

The proportion used as fuel at the wells and lost last year was 10.8 per cent of the total.

The average price of crude oil at the wells in 1902 was 6.65 kopeks per pood, which is equal to 28.8c. per barrel of 42 gallons. The average cost of production is estimated at 5 kopeks per pood, or 21.7c. per barrel. The average price of refined oil was 9.28 kopeks per pood, or 0.96c. per gallon for home trade; 8.24 kopeks per pood, or 0.85c. per gallon per export.

While illuminating oil forms the larger part of the exports, the residuum—which is very largely used for fuel in Russia—was an important factor in the home trade, as shown in the tables of shipments. The average price of residuum for last year was 7.66 kopeks per pood, or 0.79c. per gallon.

The shipments by rail from Baku for the year were 504,805,000 gals.; by sea, 2,054,990,000 gals.; total, 2,559,795,000 gals.; an increase of 93,725,000 gals. over 1901. The shipments last year were divided as follows: Illuminating oils, 601,015,000 gals.; lubricating oils, 71,580,000 gals.; residuum, 1,716,840,000 gals.; crude, 170,360,000 gals.

On the basis of crude oil delivered at refineries, the disposition of that oil was as follows last year: Illuminating oil made, 22.13 per cent; lubricating, 2.56; residuum, 61.83; waste and oil used for fuel, 13.48 per cent.

The following table gives the shipments of Russian petroleum products from Black Sea ports, in gallons, for two years:

	1901.	1902.	Changes.
Crude and residuum	14,534,220	15,509,690	I. 975,470
Lubricating	39,640,925	46,235,900	I. 6,594,975
Solar and distillate	48,214,740	45,373,800	D. 2,840,940
Refined	357,859,645	354,642,630	D. 3,217,015
Totals	460,249,530	461,762,020	I. 1,512,490

Of these shipments last year, 39,273,095 gals. were to Russian ports, and 422,488,925 gals. to foreign countries.

Mr. Chambers comments as follows on the production of last year: "The crude oil production of the Baku fields, for the first time since 1894, fell off last year, leaving 1901 the record year as far as the volume of production is concerned. The falling off was certainly not great, but it was a break in the monotony of steady increase which has been going on for eight years, resulting in more than doubling the production in that time.

"The statistics show results only, and do not indicate any of the causes for the falling off or give any reliable basis upon which to predict the future. The undoubted cause of the decline in the production was the overproduction of 1901, which was brought about by the opening for drilling of considerable tracts of territory belonging to the Russian Government. The result of this overproduction was a decline in the price of crude oil to a figure which was in many cases less than the amount to be paid the government as royalty on the territory—to a figure, almost the whole year through, at which the lessee of government territory could not work without considerable loss. The falling off from 1901 in the amount of the production from this government territory in 1902 was not great, but there was little or no drilling done on it and no new work commenced. Few producing wells were pumped in the territory where the royalty was excessive, and many of the wells, which were drilling and near completion, were stopped. In the exceedingly rich district known as Bibi-Eibat this production fell off about 1,000,000 barrels from 1901, and for the greater part of the year work on the government territory in that district practically ceased.

"The low prices also naturally stopped much work in other districts and upon other than government territory, for money was so scarce that the majority of the operators had all they could do to secure sufficient to pay current expenses without increasing their obligations by commencing new work. This is very clearly indicated by the statistics of operations, as the number of new wells commenced in 1902 was only 171, against 282 in 1901, and 473 in 1900, while in 1902 there were only 214 wells completed, against 358 in the preceding year."

IRON AND STEEL PRODUCTION IN FRANCE.

The statistics compiled by the Comite des Forges for the year 1902 have just been published. They show that the production of pig iron in France for the year was as follows, in metric tons:

	1901.	1902.	Changes.
Foundry iron	576,761	415,195	D. 161,466
Forge and steel pig	1,812,062	2,012,232	I. 200,070
Total	2,388,823	2,427.427	I. 38,604

The decrease in foundry iron was more than made up by the increase in forge and steel pig. The total number of furnaces in blast at the beginning of 1902 was 93; at the close of the year there were 97 active furnaces.

The total wrought or puddled iron reported in manufactured form last year was 625,826 tons, against 567,155 tons in 1901; an increase of 58,671 tons. The forms of manufactured iron reported were: Sheets and plates, 52,965 tons; bars and merchant iron, 572,541 tons; rails, 320 tons. The making of iron rails has almost ceased in France, as in this country.

The production of steel ingots for the year was as follows, in metric tons:

	1901.	1902.	Changes.
Bessemer steel	816,677	1,014,934	I. 198,257
Open-hearth steel	608,674	620,366	I. 11,692
Crucible and puddled steel	25,800	25,000	D. 800
Total	1,451,151	1,660,300	I. 209,149

The increase was a considerable one, the total last year exceeding the high output of 1901. The output of steel in finished forms, so far as reported, was: Rails, 301,434 tons, an increase of 9,096 tons; sheets and plates, 276,287 tons, an increase of 6,379 tons; bars, shapes and merchant steel, 653,931 tons, an increase of 39,913 tons; total, 1,231,652 tons, against 1,175,454 tons in 1901; showing a total increase of 56,198 tons last year.

IMPORTS OF BUILDING STONE.—Imports of marble into the United States in February were valued at $106,652, against $67,874 in February, 1902. Imports of other building stones were valued at $14,280, against $8,754 last year.

IRON ORE IN RUSSIA.—The total output of iron ore in Russia in 1901 was 2,317,000 metric tons. The consumption, it is estimated, slightly exceeded the production, stocks on hand at the close of 1900 having been generally used up.

NEW BLAST-FURNACE GAS PLANTS IN GREAT BRITAIN.—The Yorkshire Coal & Iron Company is erecting a new furnace at its works at Leeds, England. The furnace is expected to have a capacity of 600 tons of pig iron per week. The company has placed an order with the Blast-Furnace Power Syndicate, Limited, for a Thwaite-Gardner plant for purifying blast-furnace gas, to deal with 2,000,000 cubic feet per day. The gas is to be utilized for driving the blowing engines.

Messrs. Cochrane & Co., of the Ormesby Iron Works, in Middlesborough, some time ago put in operation at their works a blowing-engine of 600 h.p. worked by blast-furnace gas, and now intend to increase their plant by a gas-engine to drive dynamos. This engine is to be of the Cockerill type, a horizontal double-acting engine, having tandem cylinders, acting on one crank. It is expected to develop 800 h.p. at a speed of 120 revolutions per minute. The dynamos driven will furnish power to operate machinery at the works.

ABSTRACTS OF OFFICIAL REPORTS.

Allouez Mining Company, Michigan.

The report of this company for the year 1902 shows the financial condition as follows: Cash from previous year, $113,372; assessments, rents, interest, etc., $16,290; total, $129,662. Expenses at mine were $39,018; construction and general expenses, $20,831; total, $59,849; leaving a balance of $69,813, forward to current year.

The directors' report says: "At the time of the last annual meeting we had recently begun to unwater the old workings on the Conglomerate lode. After the water was out, and a thorough examination of these openings had been made, it was decided to sink No. 2 shaft to the 19th level, and drift south from that point, and also to extend the 18th level drift in the same direction. The results of this work in the quality of the rock thus disclosed give ground for confidence in the lode, with indications pointing to increased value at the south end of the mine. If farther development shows this to be the case, it will corroborate the belief long held by many familiar with the property that with a fair average price for the metal this lode can be profitably worked, if done in a large and economical way.

"At a recent meeting of the directors it was voted to sink a shaft near our eastern boundary to cut the Kearsarge lode, and work will be begun there as soon as necessary preparations can be made. The continued and encouraging success of the mines now operating this lode—the Wolverine, North and South Kearsarge, Centennial and Mohawk—has thoroughly demonstrated the continuity of this formation, and its richness at a depth of 2,600 ft. is already proven at Centennial. We have over 600 acres carrying the underlie, and greater depth on the dip of the lode than any shaft in the Lake country has yet reached."

New Idria Quicksilver Mining Company, California.

The report of this company for the year 1902 shows credits for quicksilver sold of $303,249; interest, etc., amounted to $6,740, making a total of $309,389. Expenses—including $23,868 for new construction—were $149,642, leaving a profit for the year of $160,347. Dividends paid amounted to $100,000, leaving a surplus of $60,347. The balance brought forward from the previous year was $40,929, making a total of $101,276.

The development work done for the year was 1,253 ft. of drifts. The production statement is as follows:

	1901.	1902.	Changes.
Tons ore reduced	31,866	49,160	I. 17,294
Quicksilver, flasks	4,800	7,225	I. 2,425
Quicksilver, pounds	367,200	552,713	I. 185,513
Per cent metal	0.51	0.56	I. 0.05

The directors' report says: "Results of prospecting and developing which have been carried on during the year have resulted very favorably, and the mine is looking well. The open-cut work above No. 1 level on the top of the mountain has shown up well, and is giving us a large amount of ore; all the levels from No. 1 down to No. 7 are yielding ore and in good quantities, and the No. 7 level is exceeding our expectations. Here the ore still continues to show in the face as extend the drift, and is carrying up well also; we have located another ore-body quite a distance to the east, which is very promising. We have done no work below No. 7 level, as there was no need, that already done in No. 10 showing the ore carried down. We do intend to start a lower level, however, this year, for the purpose of future operations, but there is ore for a long time in sight already developed."

Boston Quicksilver Mining Company, California.

This company's report for the year 1902 shows receipts from sales of quicksilver, $82,448; interest, etc., $1,950; total, $84,398. The expenses were $84,218, leaving a balance of $180. The debit balance from 1901 was $9,034, which was reduced to $8,854 at the close of 1902. Included in the expenses is $5,465 for new construction and repairs.

There were 2,037-ft. drifts and tunnels run during the year. The production statement is as follows:

	1901.	1902.	Changes.
Tons ore reduced	19,045	23,774	I. 4,729
Quicksilver, flasks	1,545	1,950	I. 405
Quicksilver, lbs.	118,193	149,175	I. 30,982
Per cent, metal	0.31	0.31	.....

The report says: "The work of developing and prospecting has been prosecuted with vigor during the year, and the general appearance of the mine shows an improved condition over last year. We have opened down to the 6th level, and have many points showing ore on the different levels. In addition to opening up ore bodies known to exist already, we are pushing ahead steadily into virgin ground, notably on No. 3 and No. 5 levels. No. 2 furnace is doing good work, but we have not as yet remodeled No. 1. While our results are a decided improvement over last year, we expect to do much better the coming year, and the mine presents an improved showing of ore and outlook generally.

"Our stock of supplies on hand is large, and all machinery in good shape to work cheaply. The drilling for oil by the parties who started the well a little below us has been interrupted and slow during the year; they are now at work again, and we expect will continue steadily. There continues to be a flow of oil where it was found in the mine, the same as heretofore."

Napa Consolidated Quicksilver Mining Company, California.

The report for 1902 shows receipts from quicksilver sold, $164,029; interest, etc., $4,317; total, $168,346. Expenses—including $11,483 for construction and repairs, and $22,929 for development—were $172,374, showing a loss of $4,028. This, deducted from the balance of $70,747, brought forward from 1901, left a surplus of $66,719. Three dividends, amounting to $30,000 in all, were paid, leaving $36,719 on hand.

Development included 8,376-ft. drifts run. The production was as follows:

	1901.	1902.	Changes.
Tons ore reduced	33,930	31,737	D. 2,193
Quicksilver, flasks	4,800	3,900	D. 900
Quicksilver, lbs.	367,200	298,350	D. 68,850
Per cent, metal	0.54	0.47	D. 0.07

The report says: "During the past year the property has been run upon the usual lines, a large amount of work has been devoted to development and prospecting, but as yet we have developed no new large ore bodies, though we have in sight a large quantity of medium-grade ore. The prospecting has been carried on for the most part on No. 2 and No. 3 levels, and we are now getting into a territory previously unprospected at all, and from which we hope to obtain good results, as very good indications are showing on the same veins where previously large ore-shoots have been found, and others may be fairly presumed to exist. During part of the year the grade of ore ran very fairly, but for a number of months was only medium to low grade, and this together with having to shut down No. 2 furnace for nearly three months for repairs, decreased our earnings. Conditions have improved of late considerably, and we are now in better ore. Prospecting is being pushed very vigorously, and everything being done to open up the new ground, and if we can judge from indications should show favorably before long."

Sloss-Sheffield Steel & Iron Company.

The report of this company for the year ending November 30, 1902, shows very satisfactory results. The directors state that the average prices of iron showed an increase in spite of the fact that a considerable quantity of pig iron was delivered on contracts made at lower prices during the early part of the year or in the latter part of 1901. The average price of pig iron shipped was $12.25 per ton at furnace. Costs were also reduced during the year. The general statement shows that the profit on pig iron sales was $932,493; the profit on coal, $147,340; profit on coke, $92,201. Other earnings included sales of ore and dolomite, royalties, rents, stores, etc., amounting to $252,066, making a total of $1,424,100. The deductions from this for general expenses, taxes, etc., were $85,709; for interest on bonds, $210,000, and for dividends of 7 per cent on preferred stock, $469,000, making a total of $764,709, and leaving a balance of $659,391. Adding the surplus carried over from 1901, which amounted to $539,730, made a total of $1,199,121 at the close of the year.

The net earnings given above on pig iron and coal are the balances remaining after charging all expenses and after deducting for depreciation, 1.5c. per ton for all red ore mined; 3c. per ton for brown ore mined; 3c. per ton for coal mined, and 25c. per ton for pig iron made, for extraordinary repairs and renewals fund.

The company has $6,700,000 preferred stock; $7,500,000 common stock, and $4,000,000 in bonds, of which $2,000,000 pay 6 per cent, and the remainder 4½ per cent interest. The working capital, including cash, bills receivable and other available funds for use in business amounts to $1,495,141. Additional property was purchased during the year to the amount of $263,457, and in addition the sum of $514,266 was spent in improvement and development of the mines and furnaces. A clear title has been finally obtained for the Lady Ensley furnace property, and the litigation over this property has been closed.

The outputs of coal, iron ore, etc., made during the year are shown in the following table:

	1901.	1902.	Changes.
Pig iron made	218,857	287,685	I. 68,828
Brown ore mined	234,661	298,700	I. 64,039
Red ore mined	221,789	284,482	I. 62,693
Dolomite quarried	101,349	101,069	D. 280
Coal mined	1,042,298	1,287,826	I. 245,528
Coke made	339,199	453,054	I. 113,855

The figures for pig iron given above do not include the production of the Lady Ensley furnace which this company operates under lease, handling and selling the product. This furnace produced 38,992 tons of pig iron in 1901; 37,057 tons in 1902. Since the repairs above referred to were completed the furnace is turning out pig iron at the rate of 65,000 tons a year.

The production of pig iron showed an increase of about 31 per cent, although not all of the furnaces were in blast; the Birmingham showed a decrease of 32c. per ton in the cost of making iron. Three Allis-Chalmers blowing engines have been contracted for these furnaces, which will largely increase their capacity. Philadelphia furnace is being rebuilt and enlarged. Hatty Enslie furnace is still in blast, but at the end of the present campaign, it is intended to refit it and increase its capacity. Lady Ensley furnace was strengthened by putting in boshplates, jacket, etc., and is now in very good shape.

In the coal mines the spur-track at Flat-Top has been completed, and the convicts employed by the company have been removed to these mines. They are now producing 950 tons a day, which will be increased to 1,500 tons.

A Stewart coal-washer will be completed very shortly. The Ivy Mine has been improved, and the Drifton mines have been connected with the railroad, and are now being worked. The three mines in Jefferson County on the Pratt seam were worked steadily, and are now shipping at the rate of 125,000 tons a month.

The furnace capacity has been increased, and 200 more beehive ovens are now being built at Flat-Top; an additional 100 ovens are needed to make the company safe.

At the Sloss mines development has been extended, and the mines are now in condition for an output of 1,450 tons of hard ore per day, besides some soft red ore. The Russellville brown ore mines are being actively worked. There are 12 switching engines, 7 steam shovels and a number of ore-washers employed at these mines, and new machinery is being added. At the dolomite quarry at North Birmingham slopes were driven down 20 ft. during the year, enabling the company to increase production and to reduce costs. This quarry furnishes a superior flux, and it has been decided to substitute it for the limestone heretofore used as far as possible.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the Engineering and Mining Journal.

Foreign Trade Requirements. Second Yearly Volume. 1903. New York; Lewis, Scribner & Co. Pages, 532. Price, $10.

Field Columbian Museum. Annual Report of the Director. 1902. Frederick J. V. Skiff, Director. Chicago; published by the Museum. Pages, 168; illustrated.

Maryland Geological Survey. Cecil County. Wm. Bullock Clark, State Geologist. Baltimore; Johns Hopkins Press. Pages, 324; with maps, illustrations and separate atlas.

Maryland Geological Survey. Garrett County. Wm. Bullock Clark, State Geologist. Baltimore; Johns Hopkins Press. Pages, 340; with maps, illustrations and separate large atlas.

Railroad Construction. Theory and Practice. By Walter Loring Webb. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pocketbook form, 692 pages; illustrated. Price, $5.

Review of the World's Commerce. 1902. *Introductory to Commercial Relations of the United States with Foreign Countries.* Prepared by the Bureau of Foreign Commerce, Department of State. Washington; Government Printing Office. Pages, 178.

BOOKS REVIEWED.

The Cost of Production. By Charles J. Watts. Muskegon, Mich., and Chicago; the Shaw-Walker Company. Pages, 64.

This little book describes a new system of keeping factory accounts, and especially those relating to materials, labor and other items which enter into the cost of production. The system, which was devised by the experts of the Shaw-Walker Company, is one of those card systems which are taking quite a prominent part in modern bookkeeping. It seems to offer much in the way of saving labor and time, and making facts relating to productions and costs easy of access and reference. It certainly deserves attention and examination.

Report on the Mining Industry of Natal in 1901. C. J. Gray, Commissioner of Mines. Pietermaritzburg, Natal; Government Printer. Pages, 102; illustrated.

The chief mining industry of the colony of Natal is based on coal. This is of better quality than is found elsewhere in South Africa, and is largely used by steamers, so that there is a steady demand for the output of the mines. The report covers a year when the collieries were recovering from the injuries done to them during the recent war. It gives some illustrations showing the wreck of plants during the Boer invasion in the early part of the war. The report gives full particulars as to the operation of the mines, labor, accidents, etc. Outside of coal there is comparatively little production; but recently a number of licenses have been issued to prospect for gold, copper and other metals and minerals.

Transvaal Mines Department. Report of the Government Mining Engineer for the Year Ending June, 30, 1902. H. Weldon, Government Mining Engineer. Pretoria, Transvaal; Government Printer. Pages, 128; with maps and illustrations.

The changes resulting from the late war are illustrated by the fact that this year, for the first time, the State mining report is in English. Heretofore these reports were all published in the Dutch, which was the official language of the South African Republic. The present report has been prepared under certain difficulties, which make the full statements given in its pages very creditable. Naturally considerable space is given to the labor question, which is the most important in the Transvaal at present, and must continue to be so for some time to come. The report presents some interesting facts, and is worth study by those concerned.

Victoria. Annual Report on Mines and Water Supply for 1901. J. Travis, Secretary for Mines. Melbourne, Victoria; Government Printer. Pages, 132; with maps and illustrations.

This report covers the progress of the mining industry in Victoria for the year 1901; much of the statistical and other information has, however, been previously published in separate form. Gold is the chief product of the State, constituting over 90 per cent in value of the total output. There are also coal mines of considerable importance, while copper, tin and antimony ores are also mined. The building stone and clay industries are important. In addition to the statistical information there are reports on mine inspection and accidents; and reports on different districts, giving many interesting details. Descriptions are also given of new devices introduced, and of improvements in mining methods and machinery.

Electricity as Applied to Mining. By Arnold Lupton, G. D. Aspinall Parr and Herbert Perkin. New York; the D. Van Nostrand Company. London, Crosby Lockwood & Son. Pages, 280; illustrated. Price, $3.50 net.

The use of electricity in mining has extended so rapidly in recent years that a work on the subject needs to be constantly revised to keep it up to date. The authors of this book say that their main object has been "to present the leading truths and main principles of electricity and electrical engineering, without going into great detail. . . . They are unable, in the space at their disposition, to deal with all the varieties of machines and appliances now in use, typical examples of good practice being considered sufficient for the present purpose."

We find that, of the fifteen chapters of the book, eight are devoted to general matter. After a general introduction these chapters treat of dynamic electricity, the driving of the dynamo; the steam turbine; distribution of electrical energy; starting and stopping electrical generators and motors; electric cables; and central electrical plants. The section on special applications has chapters on the use of electric power in pumping and hauling; in coal-cutting; in lighting, and for miscellaneous purposes, such as signaling, blasting, drilling, etc. Other chapters describe some typical electrical plants; compare electricity with other methods of transmitting power, and treat of dangers involved in the use of electricity.

The book is written from an English standpoint, and relates chiefly to the work which has been done in Great Britain. Necessarily, there are many references to American practice, especially in coal-cutting machinery. It is good as an introduction to the subject, to which a great deal must be added to cover recent practical applications of electricity.

Reference Library of Modern Engineering Practice. In ten volumes. Prefaced and Published by the American School of Correspondence at the Armour Institute of Technology. Chicago; total pages, about 4,000. Price, half-leather, $40.

The American School of Correspondence, formerly located at Boston, and now connected with the Armour Institute at Chicago, has gathered together its printed instruction papers in the principal departments of engineering these books. Subjects covered are as follows: In the first two volumes are treated the subjects of mathematics, theoretical mechanics and heat. Vol. III relates to the foundry, forge and machine shop; Vol. IV, to machine design and boilers. In the next two volumes are treated the subjects of chemistry and metallurgy and engines for stationary, marine and locomotive use. Electricity and its various applications are described in Vols. VII and VIII; heating, ventilating and plumbing in Vol. IX, and the concluding volume is devoted to mechanical drawing.

The volumes are made up by binding the regular instruction papers used by the school, and the paging is that of these papers and not of the separate volume. As each volume has a good table of contents, however, this does not cause the difficulty in looking up matter on a particular subject that might be supposed.

The matter in these books is, of course, elementary and presented in an elementary way. Necessarily, also, the information given is confined to the most important parts of the subject under treatment. In the case of metallurgy the compilers do not seem to have taken sufficient care to bring the matter up to date; and they have allowed some crudities of statement to creep in, which might have been avoided had this part been edited by an expert.

These volumes will have their uses as elementary works, and for the purposes of the school. A feature at the end of each volume is a set of questions covering the subjects which have been treated and by which the reader or student can test for himself the thoroughness with which he has mastered the contents of the books.

The printing and mechanical execution are good, though some of the engravings are poor. This is the more marked, as others are of very good quality. The books will doubtless circulate widely among those who become connected with the school.

Siderology. The Science of Iron. By Hanns Freiherr von Juptner. Translated from the German by Charles Salter. New York; the D. Van Nostrand Company. London; Crosby Lockwood & Son. Pages, 344; illustrated. Price, $5 net.

This book had its origin in a series of lectures delivered by the author at the Royal Academy of Mining in Leoben, Germany, several years ago. In preparing these lectures he realized that the literature on the subject was scattered through a number of technical journals, proceedings of societies, and the like; and that there was much need of a compilation showing present state of knowledge with regard to iron and its alloys. The book has been written with this object in view—to bring together in a clear and simple form the work done by different investigators in the field in such a way as to show the results obtained, without the confusion incident to the varying views of the workers. Another object is to show the consumer of iron and steel the connection between the various properties and constitution of the materials, and the methods of working them. These objects—necessarily somewhat divergent—required a more comprehensive treatment of the subject than would suffice for either of them separately. Such treatment the author was well qualified to give the subject.

With regard to the title of the book, the term selected by the author, though comparatively new, seems to express the meaning of the subject—the "Science of Iron," as differentiated from the art and practice of iron making and iron working. This science is of comparatively recent growth, and the work of investigators, such as Osmond, Howe, Sauveur and others, has shown its great importance and its bearing on practical results.

The present work is divided into three parts. The first treats at length of the Theory of Solution, which has a very important relation to recent investigations on metals and their alloys. The second part is on Micrography—the microscopical examination of the structure of the metal. The third part treats of the Chemical Constitution of the Alloys of Iron. It is in this direction that a great deal of the recent work of investigation has been done: especially in the examination of the conditions under which carbon combines with iron, and the results of such combination. The fourth part treats of the Chemical Composition of Slags.

Prof. Von Juptner's reputation as a student and scientist and the fact that his own investigations have had very important results, give his book authority. It will be very useful to students and iron metallurgists, and will help to extend the important study of the "Science of Iron."

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported.

Operatives in Mine and Mill, When One Enterprise, Fellow-Servants.—A company operated a mine and mill connected by a tramway conveying the ore from the former to the latter, where it was conveyed into a crusher; the whole constituting one enterprise. A sledge hammer was permitted to get into the ore at the mine and was carried with it to the mill and conveyed into the crusher causing injury to an employee at the mill. It was held to have been occasioned by the negligence of a fellow-servant for which the mining company was not liable.—Molique v. Iowa Gold Mining and Milling Company (71 *Pacific Reporter*, 427); Colorado Court of Appeals.

Mining Company Liable for Failure to Perform Duty.—Where one worked in a mine tunnel and was injured by reason, as alleged, of the failure of the company to provide sufficient braces to support the roof, whereby a quantity of clay fell from the roof and caused the injuries complained of, it was held that an employer is bound to provide for his employees a reasonably safe place in which to work, and is liable to his employee for injuries occasioned by his failure to perform this duty, even though the failure may have been due to the negligence of a fellow servant of the one who was injured.—Southern Bauxite Mining Company v. Fuller (43 *Southeastern Reporter*, 64); Supreme Court of Georgia.

Forfeiture of Oil Lease Conditioned on Yearly Payments a Yearly Lease.—Where the grant of oil and gas and oil and gas privileges in consideration of $1 without limitation as to time contains a forfeiture clause in these words: "In case no well is completed within two years from this date, then this grant shall become null and void as to both parties; provided, that the second party may prevent such forfeiture from year to year by paying to the first part annually in advance $18.75 at her residence, until such well is completed"—such lease is thereby converted into a lease from year to year at the option of the lessee until a well is completed, and it would then continue so long as oil or gas are produced in paying quantities.—Lowther Oil Company v. Guffey (43 *Southeastern Reporter*, 101); Supreme Court of Appeals of West Virginia.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the Managing Editor.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Possibilities of Algerian Mines.

Sir.—I would like to take the liberty of bringing to your special notice the fact that the province of Constantine in Algeria has mines of copper, iron, lead, silver-lead and zinc. It has also large deposits of phosphate-rock, which are now being exploited to a considerable extent, heavy shipments being made to European countries. As a consequence of these facts, I consider that it would decidedly be to the interest of American engineers if some of them should combine, and forming a syndicate, obtain concessions from the French Government for exploring deposits which have not already been opened. I am confident that satisfactory results could be obtained, and I believe that you will do a service by publishing these facts in your Journal.

Frank X. Fenick.

Bona, Algeria, March 18, 1903.

The Robinson & Greenawaldt Process of Gold Extraction.

Sir.—I have been searching recently for a description of the Robinson & Greenawaldt chemical process for gold extraction. I have searched the Engineering and Mining Journal from 1894 to 1902. I also wrote to Prof. R. H. Richards of the Massachusetts Institute of Technology, and he knew of no such process. I find it mentioned in some papers which I have on the suggested treatment of ore in Gilpin County, Colo. In the last report of H. L. Lee, State Commissioner of Mines of Colorado, I find mention of a Robinson & Greenawaldt process in use in Boulder City. He states it is an electrolytic modification of the chlorination porcess, but he gives no details.

If you, or any of your readers, can assist me in this matter and advise me where I can find a description of this process, or these processes, I shall be indebted to you. L. G. W.

New York, April 1, 1903.

(Can any of our readers furnish any information about the process named? It is not familiar to us.—Editor.)

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Manganese Binoxide.—I wish to find a market for a 95 per cent manganese binoxide. Can you assist me?—B. A. R.

Answer.—High-grade manganese binoxide, such as you have, is employed principally in the manufacture of chlorine, bromine, iodine and other chemicals. Good prices are paid. For buyers write to the chemical manufacturers mentioned in the advertising pages of the Journal.

Galena and Calcite.—We have a galena which shows the following analysis: Lead, 84.10 per cent; antimony, 0.454; silver, 0.52 oz. per ton; gold, a slight trace. Is this not extraordinarily rich? The gangue is calcite, assaying: Calcium oxide, 55.25 per cent; silica, 0.14; alumina and oxide of iron, 0.97; magnesium oxide, 0.23. The remainder would be (43.41) carbon dixoide. In concentrating the galena we would get the calcite, and wish to find out whether there is a market for it. Can you give us any information as to the price and the possible sale of this calcite? We are informed that it is used as a flux in blast-furnaces, in the manufacture of hydraulic cement and also in making glass.—G. L.

Answer.—Your galena is certainly very rich, pure galena being about 86 per cent lead. It is an unusually pure ore. With regard to calcite, you are correct in the uses you give for the material. The market, however, depends altogether upon the location. The price which can be obtained for the calcite is so low that it will not stand transportation to any considerable distance. Unless you can find customers for it within the limits of a short haul from your works, we fear that its sale would hardly be profitable.

Magnesia Alum.—Is there any commercial use for magnesia alum, and what price will it bring in the market? We are making inquiry for one of our patrons who has large deposits of clean crystalline magnesia alum, and would like to know how and where he can dispose of it.—P. P.

Answer.—As yet no commercial use has been found for magnesia alum. The only alums of importance are potash, ammonia and chrome alum, which are employed in dyeing, paper making, etc. We would suggest, however, that you correspond with the chemical manufacturing firms advertising in the Journal, as we believe they might be able to create some market for magnesia alum.

Fluorspar.—Can you tell me the value of fluorspar, and where I can find a buyer for it?—E. C. R.

Answer.—The consumption of fluorspar in this country is increasing, owing to the employment of this mineral as a flux in iron and steel making, as an enamel for porcelain, as a coloring material for glass, and in the manufacture of hydrofluoric acid. Domestic fluorspar, produced in Kentucky and Illinois, is sold, f. o. b. New York, at $13.90 to $14.40 per short ton for lump; $12.40 to $13.40 for gravel and crushed, and $16.50 to $17.90 for pulverized. Foreign fluorspar ranges from $8 to $14 per ton, and is imported principally from Great Britain. The variation in prices depends on quality. Important consumers are the United States Steel Corporation, 71 Broadway, New York; the Trenton Potteries Company, Trenton, N. J., and the American Window Glass Company, Pittsburg, Pa. You might also correspond with the chemical manufacturing concerns advertising in the Journal.

Arsenic in Iron Ore.—I have a very good iron ore, 54 per cent iron, 4 per cent silica, without any injurious element, arsenic excepted, the ore containing about 0.3 per cent of that element. Can you tell me (1) if this ore can lose by calcination, partially or totally, the arsenic which is in the state of FeAS? What kind of furnaces are required for this operation? Has it been made anywhere before, and what were the results? (2) If the calcination is not suitable, can this ore be sold in its rough state, in what quantity and what price can be got?—P. A.

Answer.—1. While arsenic is not an entirely unknown component of iron ore, it very rarely occurs that it is present to the amount named. In fact, it is so rare that there is no experience to guide us in this case. It is probable that roasting would free the ore from arsenic, but it is also possible that the cost would be greater than the value of the ore warrants. As there is no known case where iron ore is roasted for this purpose, the part of the question relating to furnaces used, etc., cannot be answered. This is a case where it would be best to consult an expert.

2. No price can be put on the raw ore. The ordinary blast furnace manager would certainly object to the arsenic content.

Right to Divert Water for Placer Mining.—I understand that the United States mining laws give the owner of a placer mining claim located on a stream the right to the use of all of the water of that stream, if necessary, as against the subsequent locator of a water right on the said stream. Such being the case, is it within the law to divert the waters of said stream into a ditch for the purpose of obtaining hydraulic pressure on said claim.—A. W. L.

Answer.—The law gives him the right to divert the water, provided he is the prior locator. Morrison—"Mining Rights," page 165—says: "The right of the miner to divert water from its natural stream has been not only granted, under the Act of Congress of 1866, but that act has been construed by several decisions of the Supreme Court of the United States. . . . These decisions further recognize the right of 'appropriation,' as it is called, as a necessity in placer mining districts. The party who first appropriates the water for mining purposes obtains the right, both as to parties who attempt to take it by tapping the stream above, or who need it in the stream below. A homestead or other entry is subject to the rights of a prior appropriation of water.

"A ditch is an easement over the land which it crosses. A party cannot locate a ditch in such a manner as to prevent the practical mining by hydraulic power, or otherwise, of claims which it crosses; nor so as to cut off the water used by the hydraulic."

The above applies to water not already appropriated. The law provides carefully for the protection of rights vested, by priority of possession, or otherwise, to the use of water for mining or other purposes. The new locator is subject to all such rights existing at the time his location is made.

ADDITIONS TO IRON MAKING CAPACITY.

The following summary of the additions to the blast furnace capacity of the United States to be expected during the current year has been prepared by the *Iron Trade Review*, of Cleveland, Ohio, and will be found interesting:

When the additional pig iron producing capacity projected during the past six months is completed it will increase the country's estimated yearly output, by 2,600,000 tons, and plans decided upon during that period for rebuilding stacks will increase the possible production by fully 400,000 tons, making a grand total of about 3,000,000 tons a year to be added to the pig iron producing capacity during the next year and a half, provided all projects are carried out as outlined. New stacks projected number 17. None of this additional capacity will be available this year. The statement shows that the proportion of increase to the country's pig iron producing capacity is not only being well maintained, but if anything is on the increase. New stacks projected in the last six months and their estimated annual output are as follows:

National Tube Company, one stack at McKeesport, Pa., 166,000 tons; two stacks at Lorain, Ohio, 347,000 tons.

National Steel Company, one stack at Youngstown, O., 250,000 tons.

Alabama Steel and Wire Company, four stacks at Gadsden, Ala.; work has been progressing on one stack for some time, and when this is completed the remaining three stacks will probably be built. Capacity, 700,000 tons.

Jones & Laughlin Steel Company is having plans prepared for the erection of two additional stacks at its Eliza plant on Second Avenue, Pittsburg, with a capacity of 300,000 tons.

The Southern Car & Foundry Company purchased the machinery of the old Jupiter stack at St. Louis, Mo., and has removed the same to Gadsden, Ala., where a furnace with a capacity of 175,000 tons is to be erected.

The LaBelle Iron Works will shortly break ground for the erection of a second stack at Steubenville, Ohio, to have a capacity of 150,000 tons.

Tennessee Coal, Iron & Railroad Company is having plans prepared for the erection of a large modern stack at Ensley, Ala., to have a capacity of 175,000 tons.

The Shenango Furnace Company has plans for two additional stacks at Sharpsville, Pa., to have a capacity of 300,000 tons.

The Valley Iron Company, of Birmingham, Ala., is erecting a new stack to have an output of 125,000 tons.

The Lookout Mountain Iron Company, of Birmingham, Ala., recently decided to erect a furnace at Battelle, in the Lookout Mountains, between Birmingham and Chattanooga.

In addition to the above the Pittsburg Steel Company is considering the erection of two furnaces at Monessen, Pa., the official announcement of which is expected shortly. The improvement programme of the United States Steel Corporation calls for the improvement of nearly all of its furnaces at Chicago and at Joliet, Ill., while stacks at New Castle, Pa., will also be remodeled. In the Wheeling, W. Va., district the Wheeling Steel & Iron Company will rebuild the stack which recently toppled over at Martin's Ferry, Ohio. All of the new furnaces to be erected or rebuilt in the North are to produce steel-making iron, while the furnaces in the South, with the exception of those to be erected by the Alabama Steel & Wire Company and the Tennessee Coal, Iron & Railroad Company, will produce foundry and forge iron. It is also probable that within the next six months the United States Steel Corporation will announce plans for a number of additional furnaces in the Pittsburg—at Duquesne and at the Edgar Thomson plant.

Of the 17 new stacks to be built the output of 13 will be utilized for the manufacture of steel in the plants of the companies erecting them, while the output of only four, amounting to less than 500,000 tons, will be offered on the market, according to present plans.

Within the next six months the foundry and forge iron producing capacity of new stacks and those that are being rebuilt will increase the country's capacity by fully 900,000 tons a year. All of these furnaces have been projected during the past year and a half and with few exceptions would have been in operation at the present time but for the difficulties encountered in securing building materials and machinery. According to present indications these stacks will be blown in as follows:

Cleveland Furnace Company, one stack, located at Cleveland, daily capacity 400 tons—August. It is reported, although not officially confirmed, that as soon as this stack is in operation another of the same dimensions will be built.

Toledo Furnace Company, Toledo, Ohio, daily capacity 400 tons—May.

Pioneer Iron Company, Marquette, Mich., 200 tons daily capacity, about to be blown in.

Detroit Iron & Steel Company, Detroit, Mich., furnace located on Zug Island. Daily capacity, 300 tons—July.

Rochester & Pittsburg Coal Company, DuBois, Pa., daily capacity 350 tons—July.

Buffalo & Susquehanna Iron Company, Buffalo, N. Y., two stacks, daily capacity 800 tons; will be blown in late in the year.

Penn Iron & Coal Company, Canal Dover, Ohio, daily capacity 400 tons. About ready to be blown in.

Standish Furnace of the Chateaugay Ore & Iron Company, Standish, N. Y., will be started in July. Has a small output of charcoal iron.

In the South the Central Coal & Iron Company, Tuscaloosa, Ala., will have a stack in during the summer with a daily capacity of 200 tons.

The Woodward Iron Company, of Woodward, Ala., will likewise blow in its furnace with a daily output of 200 tons, early in August, while the Alabama Consolidated Coal & Iron Company, Gadsden, Ala., will shortly have in its furnace with a daily capacity of 250 tons.

The Dover Iron Company, Bear Spring, Tenn., will shortly blow in its charcoal stack, with a small daily output.

Within the next six months not less than eleven furnaces for producing iron for steel making purposes will go into blast. One of these is Carrie Furnace No. 5 at Rankin, Pa. The three furnaces of the Clairton Steel Company, Clairton, Pa., are to go in in the months of April, June and August, respectively, while the two stacks of the Union Steel Company will start in August and September. The two furnaces of the Sharon Steel Company will be blown in in May and September. A second furnace of the Lackawanna Steel Company will come in in April, while its two large stacks will be blown in late in the summer. The remaining two cannot be completed until late in the year. These eleven large stacks will have an output of about 2,000,000 tons annually. The furnace of the South Chicago Furnace Company, which will operate on both foundry and bessemer iron, will be blown in early in May with a daily output of 400 tons.

COAL FOR DANISH RAILROADS.—The contract for supplying the mechanical departments of the Danish State railroads for the ensuing year has been let. About 40,000 tons will be taken from South Wales, and the remaining 50,000 tons will be supplied by the Westphalian Coal Syndicate.

THE BESSHI COPPER MINE IN JAPAN.—The Besshi Mine, one of the most important copper mines in the country is in the province of Iyo, on the northern side of a mountainous range, 3,600 ft. above the sea level. It is connected by a short railroad with the town of Niihama, on the northern coast of Shikoku. The mine is owned by the firm of Sumitomo. It was discovered by an ancestor of the present owners in 1690, and was opened in the next year. The annual product in a few years reached an important quantity. The copper ore is a bedded deposit found in alternating layers of schist, generally enveloped by a quartz-schist known locally as *habu*. The usual dip of the ore-bed is 45°, and the thickness varies from 4 to 30 ft., averaging about 15 ft. Faults are quite frequent. The mine workings extend for a length of nearly 6,000 ft. The ore is chalcopyrite, containing a large amount of iron pyrite, and small quantities of arsenic, cobalt, manganese and lead. The average yield is about 6 per cent of copper. The production of this mine in 1900 was 3,420 metric tons of fine copper.

INVESTIGATIONS IN THE JOPLIN REGION.—During the last two seasons detailed investigations have been carried on by the United States Geological Survey in the lead and zinc mining region of southwestern Missouri and particularly in the Joplin District, which embraces parts of Jasper and Newton counties, Missouri, and the eastern part of Cherokee County, Kansas. A geologic map of the district is in preparation, based on a detailed topographic map drawn on a scale of one mile to the inch, with contour intervals of 10 feet. This topographic map, known as the Joplin District Special, is already available. In addition to showing the occurrences of the different rocks, the geologic map will show the areas that have yielded ore, as well as their mutual relations. The report of this investigation will be illustrated by maps, sections, and photographs. It is intended to supplement for the Joplin District the preliminary report on the lead and zinc deposits of the Ozark already published by the Survey. It is hoped that further light will be thrown on some of the extremely complex problems connected with the occurrences of lead and zinc in this region.

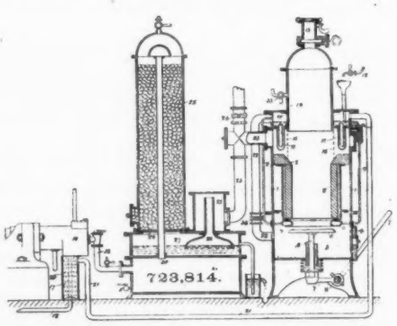
PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Engineering and Mining Journal upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the Journal in which notice of the patent appeared.

Week Ending March 31, 1903.

723,814. GAS PRODUCING PLANT.—Frederick E. Bowman, Manchester, England. In combination, a gas-engine, a vertical generator connected thereto and having near its top an annular boiler, fitted with Field tubes depending from it, a movable furnace-grate contained in an air-tight



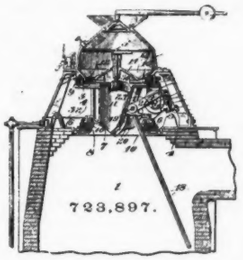
chamber and arranged to be raised and lowered, while the chamber is closed, by means of a hand-lever, an air-pipe extending from the external casing of the exhaust-pipe of the engine into the steam-space of the boiler and connections therefrom to the closed chamber of the fire-grate.

723,834. STEEL OR OTHER METAL ROLLING.—William Cooper, Denver, Colo.—In rolling metal, the process of forming a bloom or billet by subjecting an ingot in a heated state to the action of idle rolls by means of pressure applied to the rear of said ingot.

723,865. ORE-CONCENTRATOR.—Franklin W. Harlow, Eureka, Colo.—An ore-concentrator having a pan mounted to swing, an actuating device for the pan, an adjustable controlling device for controlling the stroke of the pan, and a governor driven in unison with the actuating device and automatically adjusting said controlling device.

723,897. GAS-PRODUCER.—Charles H. Morgan, Worcester, Mass., assignor to Morgan Construction Company, Wor-

cester, Mass. In a gas-producer, the combination with a gas-producing chamber having an opening in the top, and



means for feeding coal through said opening, of a poker constructed and adapted to travel in a circular path through the opening independent of the body of the gas-producer, and means for swinging the poker on its axial support during its rotary travel, whereby it takes a spiral course through the coal.

723,920 and 723,921. DUMPING-CAR.—Jay B. Rhodes, Harvey, Ill. In a dump-car, the combination of a suitable truck, a tilting receptacle carried by said truck, gates or side-boards normally closing the open sides of said receptacle, swinging arms connecting the said gates or side-boards with the said receptacle, props or supporting members having their upper ends pivotally connected with said arms, a single bar having one end pivotally connected with the lower end of each prop or supporting member, and a pair of bars connecting the other end of each single bar with the said truck.

723,932. CENTRIFUGAL ORE-CONCENTRATOR.—Philip H. Shue, Ouray, Colo. In a centrifugal ore-separator, in combination, inner and outer rotatable casings spaced apart with a free passage between them and at the discharge end, the inner casing having separating-openings, an ore-feed into the inner casing, and a wash-water feed into the space between the casings.

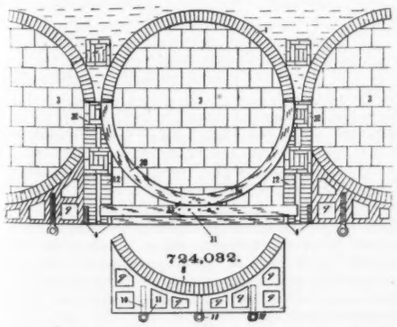
723,949. PROCESS OF SEPARATING COPPER FROM ORES.—George D. Van Arsdale, New York, N. Y. In the process of separating copper from a solution containing cupric sulphate, the step of impregnating said solution with sulphur dioxide only to affect a separation of the copper by precipitation.

723,971. CONVERTER.—Alfred M. Acklin, Pittsburg, Pa. A conveyer, comprising a receptacle or trough, an endless chain or rope having flights or members thereon for engaging with the material within the trough, said chain or rope being arranged upon a horizontal plane or level, guide-ways or tracks above said trough and above said chain or rope, and connections between said tracks and flights or members to support the said flights or members above said trough.

723,982. RECEPTACLE FOR CONTAINING MOLTEN MATERIAL.—Homer Brooke, Jersey City, N. J. A receptacle for containing molten material provided with an opening in its side wall, and a discharge-mouth located in said opening and movable therein, the said mouth being provided with a passage which when the mouth is moved into discharging position permits the continuous flow of molten material from the receptacle therethrough and being arranged in such relation to said opening in the receptacle that a seal or packing of the contents of the receptacle in a partially congealed or plastic condition is made between the outer surfaces of the said mouth and the opposed faces of the said opening and maintained of substantially uniform thickness throughout all the movements of the mouth.

724,030. GAS AND TAR SEPARATOR.—Edwin A. Moore, Philadelphia, Pa. A separator provided with a reticulated gasket the diameter of the interior of the separator and having an inner suspended reticulated member, and a tar-discharge in the bottom of the separator.

724,032. COKE-OVEN.—George F. Myers, Pittsburg, Pa. A coke-oven, provided with a vaulted roof of the bee-hive



type and having a U-shaped floor, and a door removable along said floor, the inner face of said door conforming in curvature to the inner periphery of the oven.

724,043. COMPOSITION OF MATTER.—Solomon Richman, New York, N. Y., assignor to National Enamelling and Stamping Company, New York, N. Y. An enamel containing feldspar, borax, soda, kryolith, saltpeter, magnesia, oxide of antimony and china-clay.

724,054. RECIPROCATING CONVEYER.—Friedrich H. Schule, Hamburg, Germany. In combination, a reciprocating conveyor-body, a conveyer element reciprocating therewith and reversibly securable thereto and means for delivering the material from either end of said body.

724,066. PYROMETER.—Jasper Whiting, Boston, Mass. A pyrometer comprising a receptacle, a body of liquid contained in said receptacle, means for exposing said body of liquid at one point to a source of refrigeration, means for exposing said body of liquid at another point to a source of heat the temperature of which is to be ascertained, said receptacle being arranged for the closed circulation of said body of liquid between the source of refrigeration and the source of heat and means for ascertaining the difference in temperature between the hot and cold portions of said body of liquid.

724,069. ELECTRIC FURNACE.—Robert Winter, Berlin, Germany. In an electric furnace the combination with the outer walls of rods, of fireproof and insulating material, covering the inner faces of said walls, grooves in opposite walls of the casing of the furnace, to freely receive the ends of said rods, passages in said rods, heating-wires, resting freely in said passages and means for securing the outer ends of the wires to the furnace.

724,076. APPARATUS FOR EXTRACTION OF PRECIOUS METALS.—Jose B. de Alzugaray and William A. Mercer, London, England, assignors to the Baxeres Gold Extraction Company, Limited, London, England. Apparatus for use in treating ores and comprising a lead-lined vessel capable of being hermetically closed and provided with a gage-glass and a filling device, a vertically-adjustable air-inlet pipe, an outlet-pipe provided with an inspection-glass and means for agitating the contents of the vessel.

724,094. INCRUSTATION PREVENTIVE.—Robert L. Gamlen, Bromley, England. A method for the prevention or removal of boiler incrustation, which consists in introducing into the boilers non-vegetable fiber which has been reduced to a fine state of division, whereby said fiber becomes dispersed throughout the water in the boiler.

724,107. COMPOSITION OF MATTER FOR ELECTROLYTIC DEPOSITION.—Edward D. Kendall, New York, N. Y. A composition of matter consisting of a suitable aurate and a suitable ferrocyanide.

724,108. COMPOSITION FOR COATING METAL WITH SILVER.—Edward D. Kendall, New York, N. Y. A composition of matter consisting of a salt of silver, a suitable thiosulphate and siliceous powder.

724,140. PROCESS OF REPHOSPHORIZING STEEL.—John Stevenson, Jr., Sharon, Pa. A method of rephosphorizing iron or steel, consisting in adding thereto an alloy of iron, phosphorous and manganese.

724,141. ALLOY—John Stevenson, Jr., Sharon, Pa. A new metallurgical product consisting of iron in combination with the elements phosphorus and manganese in large proportions.

724,142. METOD OF MAKING ALLOYS.—John Stevenson, Jr., Sharon, Pa.—A method of producing an alloy of iron with large proportions of phosphorous and manganese, consisting in smelting a material containing a high proportion of managanese with a material containing a high proportion of phosphorus, one or the other of said materials also containing iron, and thereby producing a phosphoric ferromanganese.

724,160. DRILL FOR BORING WELLS.—William H. Clark and Frank J. Currier, San Francisco, Cal. In a drill, the combination, with the drill proper, of a plate around the stem of said drill, an upper plate, rods connecting said plates, levers pivotally supported by the upper plate, a hammer for driving the drill, and provided with means for rocking said levers by its reciprocation, a ratchet-wheel for rotating the drill, and means carried by said levers for rotating said ratchet-wheel.

724,235. PROCESS OF MAKING PIGMENTS.—William J. Armbruster, St. Louis, Mo. In the manufacture of pigments, the process of adding the hydrate of an alkali metal to a soluble salt of zinc, then adding a salt of barium, and recovering the resulting precipitates.

724,243. FUSIBLE PATTERN.—Frederick Baldt, Sr., Chester, Pa. A fusible pattern composed of lead, bismuth and zinc in substantially equal proportions.

724,214. ARTIFICIAL FUEL.—William B. Smith, Plainfield, N. J., assignor of one-half to Harold P. Brown, Montclair, N. J. An artificial fuel consisting of the residuum from the manufacture of acetylene gas and ash and cinder.

724,234. PIGMENT AND PROCESS OF MAKING SAME.—William J. Armbruster, St. Louis, Mo. A process of making pigment which consists in mixing solutions of barium hydrate, a carbonate of an alkali metal, and a salt of zinc, and recovering the resulting precipitates.

724,251. PROCESS OF PRODUCING SULPHURIC ACID AND METALLIC-OXIDES.—Henry S. Blackmore, Mount Vernon, N. Y. A process of making sulphuric acid which consists in displacing sulphur and oxygen from solid compositions containing said elements by the action of a fluid containing hydrogen and oxygen heated to a higher temperature than that of the solid compositions, and maintaining the ingredients at a reacting temperature and below the temperature at which sulphur dioxide is liberated from sulphuric acid by the action of heat.

724,257. BLOWPIPE-BURNER.—Harry S. Burton, Oxford, England. A blowpipe-burner including a pair of tubes arranged end to end, one having a valve and the other a seat for said valve, and one of said tubes being angularly movable with respect to the other, whereby, on such movement, the valve will be forced open, a gas-tight casing surrounding the adjacent ends of the tubes, and a blast-pipe co-operative with one of said tubes.

724,294. BLACKSMITH'S FORGING-HAMMER.—Cornelius Jewell, Walled Lake, Mich., assignor to James M. Hoyt, Walled Lake, Mich. In a hammer the combination with a support having means thereon for holding work, of a retainer secured to said support, a vertically-disposed pivotally-mounted standard, a hammer movably mounted in the upper portion of the said standard, a pull-bar pivotally mounted in the standard, a treadle pivoted to the standard, a link loosely attached to the pull-bar and hammer-helve, a link loosely connected to the treadle and pull-bar, and an adjusting-bar also pivotally connected to the standard and movably engaging the retainer, the hammer and adjusting device having springs attached thereto.

724,317. PROCESS OF COATING WITH METAL.—Charles E. Munroe, Washington, D. C., assignor to Kuhn Formaldehyde Generator Company. A process of forming upon metallic or other surfaces a coating of finely-divided metal which consists in successively immersing the body to be coated in a solution of a compound of the metal and in a solution of a compound adapted to react upon the compound of the metal to form a crystalline compound of the metal, and subsequently heating the body thus coated.

724,350. APPARATUS FOR WATERING COKE-OVENS.—Daniel B. Stauft, Scottdale, Pa. A device for sprinkling coke, comprising a body or casing, a hollow pivot mounted to turn therein and communicating with the interior thereof, said pivot projecting above the body, a perforated sprinkler-tube attached to the said pivot, a supply-tube passing to the body or casing, and a lock device mounted on the top of the body and removably engaging the pivot to prevent its axial movement on the body, said lock device permitting the rotation of the pivot.

724,357. GAS-GENERATING SYSTEM.—Charles Whitfield, Kettering, England. Gas-producing plant, comprising a gas-producer, a gas-holder, means for causing gas to flow from the gas-delivery pipe of said producer to said gas-holder, a normally closed gas-circulating pipe connecting said gas-holder to said gas-delivery pipe, and means for automatically opening said gas-circulating pipe upon said gas-holder being charged with gas to a predetermined amount.

724,376 and 724,377. FURNACE FEEDING APPARATUS.—Charles W. Bray, Pittsburg, Pa., assignor to the American Tin Plate Company, Orange, N. J. A heating-chamber having supports extending within the same, means for moving plates thereon through the chamber, and holding-rods extending longitudinally of the chamber and over the course of the plate to prevent them from climbing.

724,387. METHOD OF PRODUCING STORAGE-BATTERY PLATES.—William Gardner, Chicago, Ill., assignor, mesne assignments, to Henry T. Clarke, Jr., trustee. A process of oxidizing lead plates, which consists in passing an electric current from the plates through an electrolyte containing in solution three acids one of which is a good solvent of lead, another a poor solvent of lead, and the third an organic acid.

724,414. COPPER-LEACHING PROCESS.—George H. Waterbury, Denver, Colo., assignor of sixty per cent to Nathan W. Blethen, Arthur E. Van Deusen, Charles P. Schumaker, and Charles F. Davies, Denver, Colo., and George D. Nickel, Del Norte, Colo. A copper-leaching process, consisting in placing the suitably-pulverized ore in a leaching-tank, adding thereto acid, salt, oxide of manganese and water in suitable quantities, heating the mass to the desired temperature, and subjecting the pulp to agitation until the copper has been dissolved.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending March 14, 1903.

4,085 of 1902. ANNEALING METALS.—T. V. Hughes, Birmingham. Heating and annealing metallic articles in a neutral atmosphere so as to prevent the formation of scale.

5,950 of 1902. STEEL FACING JAWS.—W. Shepard, Ecclesfield. Method of making interchangeable and renewable hard steel facings for ore breakers of the jaw type.

7,505 of 1902. MAKING ALKALI METALS.—Chemische Fabrik Griesheim Electron, Frankfurt on Main, Germany. Making alkali metals by acting on their fluorine compounds with metallic aluminum.

21,829 of 1902. OPEN-HEARTH STEEL FURNACE.—S. Surzycki, Czenstochowa, Poland. A continuous Siemens Martin furnace where only one half of each charge is run off and molten pig and ore added.

25,448 of 1902. PULVERIZER.—J. Wustenhöfer, Dortmund, Germany. Improvements in the inventor's pulverizing mills of the pendulum type.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mr. Herbert K. Scott is now at Rio de Janeiro.

Mr. C. L. Wright sailed on the *Oceanic* for London April 8.

Capt. Duncan McVichie has returned to Utah from his visit to Boston and New York.

Mr. W. H. Muzzy, of Victor, Colo., is head assayer at the San Luis Potosi Smelter.

Mr. D. W. Brunton, of Denver, Colo., sailed from New York April 9 on the *Deutschland*.

Mr. C. R. Brown, of Central City, Colo., has gone to Tonopah, Nev., to look over properties.

Mr. J. T. Pendegast, of Prescott, Ariz., is in the Lake Superior copper district on business.

Mr. Frank Lewis Nason is in Arkansas examining mining properties for New York City men.

Mr. L. D. Godshall, who has lately taken up residence at Denver, Colo., is now in New York City.

Mr. G. N. McCollough, of Pasadena, Cal., is visiting the mines in the Lake Superior copper district.

Mr. S. A. Witherby, of Detroit, Mich., is in Mexico, looking after mining interests in Guerrero.

Mr. R. J. Coleman, of Salt Lake, Utah, has been in Zacatecas, Mex., making some mine examinations.

Mr. Bulkeley Wells, general manager of the Smuggler-Union mines at Telluride, Colo., is in New York City.

Mr. Randolph Van Liew, of Globe, Ariz., has gone on important professional work to the interior of Mexico.

Mr. Hal. W. Hardinge, of Denver, Colo., has arranged to open an office as consulting engineer in New York City.

Mr. J. F. Parkes, superintendent of the Kennedy Mine, at Jackson, Cal., is to go to Phœnix, Ariz., for his health.

Mr. Joseph Farren is general superintendent of the Glasgow & Western Exploration Company's mine, near Golconda, Nev.

Capt. Joe Tonkin, of Calumet, Mich., is inspecting mining properties in the Warren mining district of Cochise County, Ariz.

Mr. J. H. Woodward, president of the Woodward Iron Company, in Birmingham, Ala., has returned from a trip to California.

Mr. E. D. Elson, general manager of La Dicka Mines, near Chilpancingo, Guerrero, Mex., has returned from San Francisco, Cal.

Capt. Thomas Hoatson, of Calumet, Mich., is at Bisbee, Ariz., inspecting the Calumet & Arizona copper mine, in which he is heavily interested.

Mr. Willis McCornick, who is interested in a mining enterprise in Siberia, passed through Salt Lake, Utah, last week on his way to California.

Mr. E. H. Blake, of Brocton, Mass., president of the Fanny Marie Mining Company, recently visited the company's mines at Mokelumne Hill, Cal.

Mr. Guy R. Johnson has been appointed superintendent of the South Chicago blast furnaces of the Illinois Steel Company, at South Chicago, Ill.

Mr. J. E. Ryan, of Salt Lake City, has gone to the Pacific Coast on business, and will remain 2 or 3 months, with headquarters at San Francisco.

Mr. B. P. Howells, superintendent of the Dalton Mine at Marysvale, Utah, is at Virginia City, Nev., to recuperate, having been in ill health for some time.

Mr. D. E. Headley, of British Guiana, is organizing a prospecting party to search for diamonds in French Guiana for a syndicate of leading local men.

Mr. C. E. Palmer, of Colorado Springs, Colo., has been appointed superintending engineer of operations to the Guggenheim Exploration Company, of New York.

Mr. J. C. Williams, of Chicago, vice-president of the Oro Verde Mining and Milling Company, visited the company's property at Yankee, Colo., during last week.

Mr. W. Vigoe, for years at the head of the cyanide department of the Mexican Gold and Silver Recovery Company, has resigned and gone to London to reside.

Mr. Edward H. Sanborn, recently assistant to Mr. Theodore C. Search, vice-president of the Consolidated Lake Superior Company, succeeds Mr. Search as vice-president.

Mr. Charles Briggs, president of the Calumet & Arizona Mining Company, who is heavily interested in Arizona mines, has returned to Calumet, Mich., from a visit in the East.

Mr. Lew Humphreys, of Central City, Colo., accompanied by Mr. Chas. M. Becker, of Denver, has gone to California and Nevada to report on mining and smelting propositions.

Mr. Joseph H. Sands has been appointed general manager, with offices at Roanoke, Va., for Castner, Curran & Bullitt. He will have jurisdiction over freight rates and transportation.

Mr. Erik Nystrom, of Stockholm, Sweden, an expert in Swedish methods of tracing magnetic ore deposits, is now assistant to Dr. Haanel, Dominion Superintendent of Mines at Ottawa.

Mr. H. J. Burtwell recently returned to San Francisco from an examination of mining properties in Porto Rico and Cuba. He also inspected copper deposits in Virginia and North Carolina.

Mr. A. L. McEwen has resigned as superintendent of the California Mine, near Sumpter, Ore., and has been succeeded by Mr. C. R. Townsend, who was formerly in charge of the Don Juan Mine.

Prof. Raphael Pumpelly, it is stated, is on his way to Turkestan, to conduct geological explorations there. Prof. W. M. Davis is to join him. The region traversed will be between Samarkand and the Aral Sea.

Mr. A. J. Bettles, chief consulting engineer for Mr. Samuel Newhouse, has been visiting Tonopah, Nev., to inspect the properties of the Hannapah Mining Company, in which Mr. Newhouse is interested.

Mr. J. C. Maben, president of the Sloss-Sheffield Company, leaves Birmingham, Ala., this week on a trip to Europe, to be away two or three months. During his absence Mr. J. W. McQueen will be in charge of affairs.

Mr. J. M. Callow, of Salt Lake City, has been engaged by the University of Utah to design and equip a complete metallurgical laboratory. He has also a force of draftsmen engaged on designs for the Yampa Smelter at Bingham.

Mr. Cornelius Shields, first vice-president of the Dominion Iron and Steel Company, of Sydney, C. B., has been elected president of the Consolidated Lake Superior Company, the parent company of the Clerque enterprises at Sault Ste. Marie, Ont.

Mr. H. Ross Skinner, from Johannesburg, arrived in New York April 4 on the *Umbria*. Mr. Skinner is appointed by the government of the Transvaal to investigate Chinese labor conditions with a view to a possible introduction of Chinese coolies into the Rand District.

Mr. Percy S. Davis, one of the directors of the Davis Calyx Drill Company, has returned from a prolonged business trip in Australia. On the way back Mr. Davis stopped at Sonora, Mex.; Virginia City, Nev., and a number of other places where the Davis drills are in operation.

Dr. R. W. Raymond returned from Europe on April 8, after an absence of five months. His abstention from work has done Dr. Raymond much good, and his return will be good news to a host of friends, and particularly to this JOURNAL, of which he is its chief special contributor.

Mr. H. A. Shipman, late manager of Stratton's Independence, Cripple Creek, Colo., and now manager of the Cosmopolitan Mine, at Koonkynie, West Australia, did some good work recently in stopping a break in the slimes dam of the Cosmopolitan Mill, which burst and flooded the main street of Koonkynie. The town council wanted to lay claim to the gold in the slimes in return for the damage done to the street, but the difficulty was amicably settled.

SOCIETIES AND TECHNICAL SCHOOLS.

MISSOURI SCHOOL OF MINES.—The class in Geology and Mining of this school at Rolla, Mo., will make a summer excursion this year, in charge of Director Ladd, to the Black Hills, S. D.; Butte and Anaconda, Mont., and to the Yellowstone Park. Similar excursions will in the future be a required part of the work.

The new catalogue of this school announces that there will be during the spring and summer months, as a part of regular courses, excursions to the Joplin District for mine surveying; to the Gasconade River for field practice in lines of communication; to southeast Missouri for geological field work, and to Joplin, St. Louis, Herculaneum and the Flat River District for the study of mines and ore-dressing and of metallurgical plants.

AMERICAN ELECTROCHEMICAL SOCIETY.—In connection with the meeting in New York City, a banquet will be held at the German Liederkranz clubhouse, on April 16, at which the following guests are expected: Dr. Walter Nernst, Gottingen, Germany; T. J. Baker, of the American Chemical Society; Charles F. Scott, of the American Institute of Electrical Engineers; William McMurtrie, of the Chemists' Club; James M. Dodge, of the American Society of Mechanical Engineers; V. Coblentz, of the New York section of the Society of Chemical Industry; A. R. Ledoux, of the American Institute of Mining Engineers; Dr. H. W. Riley, chief chemist of the Agricultural Department, Washington, D. C., and Dr. Samuel Sheldon, of the New York Electrical Society.

Excursions have been ararnged to the works of the Crocker-Wheeler, Ampere, N. J.; the Willyoung & Gibson Company, New York City; the Sawyer-Man Electric Company, New York City; Eimer & Amend; the Cooper Union, the Brooklyn Navy Yard, the Rapid Transit tunnel, Columbia University and the new power houses of the Metropolitan, Manhattan and Edison companies.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on March 21 there were 88 members and visitors present.

Mr. Howard W. DuBois presented a paper on "Reconnaissance Methods of Surveying in a Mountainous District." The work described was done in connection with a mining reconnaissance made during the past two seasons along the main range of the Rockies in British Columbia.

Where more accuracy is desired than can be obtained by the prismatic compass and aneroid barometer, it is quite natural to make use of a small plane table provided with a plain sight alidade. Great difficulty in the use of a plane table in such a district is in the liability of the working sheets to damage from moisture. This was obviated by the use of thin sheets of celluloid kept flat by a special device. Where a large area is to be covered the plane table is too slow, but the photographic method is particularly adapted to reconnaissance work. Mr. Du Bois used a simple box camera with very good results. He explained from a number of slides the construction and use of this form of camera. Where distances are wanted immediately there is no simpler way of obtaining them than by the use of the prismatic stadia, which was described some 12 years ago by Prof. Richards, of the Massachusetts Institute of Technology. The merits of this instrument seems to be but little appreciated. After giving it a fair trial last year, in a very rough section of the Rockies, Mr. DuBois stated that he was quite enthusiastic over it. In addition to a number of slides showing the construction and principle of the prismatic stadia, several of these instruments were exhibited.

INDUSTRIAL NOTES.

The Joseph Dixon Crucible Company, of Jersey City, N. J., has taken an Indian contract for its graphite specialties.

The Rand Drill Company, through its New York office, has secured a large contract for drills, etc., to be shipped to South Africa.

The Holthoff Machinery Company, of Cudahy, Wis., has secured an order for a stamp and concentrating mill from the Wisconsin-Mexico Mining Company, of Mexico.

The Allis-Chalmers Company, of Chicago, announces that it has secured the license to manufacture the Overstrom concentrating table. This company is now the only licensee and maker of these tables.

Foreign shipments through Eastern seaboard ports of iron pipe made by the National Tube Company were 3,500 tons in March. Mexico took 1,308 tons, China and Japan 643 tons, and Continental Europe 806 tons.

Stratton's Independence, Limited, of Victor, Colo., has installed a Jeanesville Iron Works compound condensing pump, having a capacity of 1,000 gals. per minute, on the 1,400-ft. level of the Independence Mine. This is the deepest pumping plant in Colorado.

The Stephens-Adamson Manufacturing Company, Aurora, Ill., has recently taken a contract for the complete equipment of a large cement plant near Easton, Pa., amounting to 15 or 16 car-loads of machinery, including belt conveyors, elevators, transmission machinery, etc.

The Buffalo Forge Company, of Buffalo, N. Y., has established a new branch office in Detroit, Mich., in the Majestic Building, to meet the needs of the rapid growth of the company's business in Michigan. H. M. Brightman is in charge of the company's business in the Michigan district.

On account of its constantly increasing business the Crandall Packing Company has found it necessary to lease larger quarters at 123 Liberty Street, New York City, where the offices and salesroom will be located. S. M. Hildreth, local manager, will be in charge, and will welcome all users of packing.

The electrical and mechanical engineering business of the late A. M. Patitz has been acquired by the Newton Engineering Company, Hathaway Building, Milwaukee, Wis., which has extended its business of structural and civil engineering to include hydraulic and electric power plants and water works.

Two large Cross oil filters were recently ordered from the Burt Manufacturing Company, Akron, O., by the United States Steel Corporation, making 114 now in use in its different mills. A very large Cross oil filter has been ordered by the B. F. Goodrich Company, of Akron, O., to be used in connection with a Westinghouse steam turbine engine.

The American Steel and Wire Company shipped abroad through Eastern seaboard ports 7,000 tons of wire and wire nails in March, the wire shipments being 4,824 tons; Australia took 1,754 tons, South American countries 1,750 tons, and South Africa 861 tons. Great Britain took 767 tons of wire nails, China and Japan 450 tons, and South Africa 212 tons.

J. B. d'Homergue, manager of the Keystone hair insulator department of the H. W. Johns-Manville Company, is in England, where he will make an exhaustive and comprehensive investigation of the trade for asbestos and sound-deadening materials in that country. Upon his return, about May 1, he will be permanently located in New York City.

A contract for the largest interlocking installation ever placed in America, and probably the largest in the world, has recently been given to the Union Switch and Signal Company for the St. Louis Terminal. The Westinghouse electro-pneumatic system will be adopted. The contract calls for 258 working levers, with 51 spare levers, which will perform 748 functions.

A 2,500-h.p. equipment of waterwheels is about to be shipped to Spain for the purpose of operating a cement manufacturing plant now under construction in the vicinity of Barcelona. The wheels, 10 in number, and varying from 24 to 84 ins. in diameter, have been ordered from the Pelton Water Wheel Company, 143 Liberty Street. The contract also calls for three miles of steel riveted pipe, 25, 28 and 31 ins. in diameter.

The Aultman-Taylor Company, of Mansfield, O., recently closed several important contracts for Cahall boilers, among them one for the power plant of the New York Central Railroad Company's large elevators at Weehawken, N. J., to consist of 4 horizontal water tube boilers of 500 h.p. each. Another large order has been received from the National Steel Company for the New Castle, Pa., plant of the Carnegie Steel Company. This will include 15 boilers of 250 h.p. each.

The new officers of the Stanley Electric Manufacturing Company, of Pittsfield, Mass., elected at the recent meeting of the board of directors are as follows: President, W. Murray Crane, Pittsfield, Mass.; first vice-president, Dr. F. A. C. Perrine, Pittsfield, Mass.; second vice-president, M. D. Barr, New York City; third vice-president, S. N. Hammill, New York City; treasurer, W. W. Gamwell, Pittsfield, Mass.; assistant treasurer, R. S. Murray, Pittsfield, Mass.; secretary, W. S. Westover, New York City; assistant secretary, A. G. Davis, New York City.

The plans have been completed for the new plant of the Lidgerwood Manufacturing Company in Newark, N. J., which when completed will cost about $2,500,000, and give employment to at least 2,500 men. The company is now making arrangements for the foundry, which will be 120 by 500 ft., and have an extension of 75 by 80 ft. and 3 cupolas. Work will be begun immediately. The principal building of the plant will be the erecting room, which will be 120 by 720 ft. The light and heavy tool shops will each be 75 by 267½ ft., and buildings of the same size will form the blacksmith, boiler and pattern shops, as well as the shipping department.

The Brown Hoisting Machinery Company, of Cleveland, O., is working on a contract amounting to $350,000 for the shipbuilding yards of Harland & Wolf, of Belfast, Ireland. The outfit includes 3 large cranes on trestles 120 ft. high and 600 ft. long. Each of the cranes will operate over 2 ship ways, and the entire plant will be motor driven. The company is erecting a large coal-handling outfit to be installed at Wakamatsu, Japan. The outfit will consist of a train of buckets, each large enough to hold the contents of a small car, the buckets to be conveyed and dumped into the hold of a vessel. The company is also erecting a conveying outfit for the Pittsburg & Conneaut Dry Dock Company, at Conneaut, O.

The Herron-Brady Pump and Foundry Company, of Chattanooga, Tenn., recently incorporated with a capital of $100,000, has buildings under way for the manufacture of steam pumps, gate valves and fire hydrants. The machine shop building will be 150 ft. long and two stories high, with a traveling crane traveling full length of building. The buildings will be equipped with the latest tools. The company is also building a foundry 150 by 100 ft. The buildings when completed will cost about $60,000. The company expects to be running in all departments by June 15. The officers of this company are: Charles Herron, president; T. Brady, vice-president and manager; P. J. Crimmins, secretary and treasurer.

Messrs. John F. Kelly, T. W. Kloman and W. L. Fairchild have formed The John F. Kelly Engineering Company, and will act as consulting and contracting engineers, with offices in New York City. Mr. Kelly is president of the company, Mr. Fairchild vice-president and secretary, and Mr. Kloman treasurer and manager. Messrs. Kelly, Fairchild and Kloman have been connected for years with the Stanley Electric Manufacturing Company. The new firm will pay especial attention to power transmission projects in the West and in Mexico. Mr. Kelly, who will remain consulting engineer of the Stanley Instrument Company, has planned the success of the several great electric power installations. The members of the firm are now consulting engineers to the Conchas River Power Company, which will supply power to Parral and other nearby camps in Chihuahua, Mex.

The Lombard Water Wheel Governor Company, of Boston, Mass., reports a good demand for its high-grade waterwheel governors. It recently closed orders with these concerns: Cascade Electric Company, of Berlin, 1 Type B governor; Redlands Electric Light and Power Co., of California, 1 Type F governor; Brattleboro Gas Light Co., Brattleboro, Vt., 1 Type O governor; Ware Shoals Manufacturing Company, Laurens, S. C., 3 Type B governors and 4 hydraulically balanced relief valves; Athens Electric Railway Company, Athens, Ga., 1 Type D governor; Ludlow Manufacturing Associates, Ludlow, Mass., 1 Type D governor; Sebasticook Power Company, Sebasticook, Me., 3 Type D governors; Niagara Falls Power Company, Niagara Falls, N. Y., 1 Type G governor; Lynchburg Water Power Company, Lynchburg, Va., 2 Type B governors, 2 Type P governors, and 4 electric speed controllers; Public Works Company, Bangor, Me., with electric speed controllers; Zanesville Electric Light and Power Company, Zanesville, O., 2 Type B governors, with electric speed controllers; Canadian Electric Light Company, Levie, Que., 1 Type B governor; Victor M. Braschi & Brother, City of Mexico, 1 Type F governor; Sacramento Electric, Gas and Railway Company, 1 Type B governor and electric speed controller; Valley Counties Power Company, of California, 2 Type D governors, with electric speed controllers; also some governors ordered through dealers for destinations unknown.

TRADE CATALOGUES.

The American Blower Company, of Detroit, Mich., issues an attractive little pamphlet describing its A, B, C fans, blowers, engines and heating and ventilating apparatus. The pamphlet is neatly printed and has an artistic cover.

The Gandy Belting Company, of Baltimore, Md., issues a notice that unprincipled dealers are imposing on the consumer by substituting cheap stitched cotton belting for the Gandy; the genuine bears stenciled on it every 10 ft. "Original Gandy Belt."

Pamphlet 031, sent out by the C.W. Hunt Company, of West New Brighton, N. Y., shows some applications of the company's industrial railway tracks and equipments, particularly for hauling coal to boiler rooms and for removing ashes. The C. W. Hunt Company builds industrial railway tracks, switches, turn-tables and many kinds of cars to suit all kinds of service.

The Power Specialty Company, of Buffalo, N. Y., manufacturing the Bundy steam and oil separators, the Spencer damper regulator and other specialties for boiler plants, issues circulars describing the Diamond steam cleaner, a little device operated by steam or compressed air, which has a small iron vibrator that under a steam pressure of 40 or 50 lbs strikes from 1,200 to 1,500 blows a minute. These rapid blows loosen and dislodge any soot or soot-rust in boiler tubes, or hard scale in water-tube boilers. The loosened soot or scale is blown out by the escaping air or steam.

Catalogue No. 5 E, issued by the Colorado Iron Works Company, of Denver, Colo., is an attractive pamphlet of 36 pages, describing the 1903 model of the Bartlett concentrator. The company states that the table has been on the market over 3 years, and more than 1,000 have been sold and placed in mills. The 1903 model contains many important improvements devised by the inventor, Dr. Bartlett. These are a new adjustable positive movement, simple and effective, which can be applied to any of the company's older tables; cut-under rubber riffles, and a new feed system doing away with the former cone sizer. The height of the table to the feed-box has been reduced from 5 ft. to 3 ft. 10 ins. The new adjustable movement is stated to give a very slow forward movement and sharp, quick return. The movement of the ore can be regulated instantly while the table is in operation. Besides describing the table, the pamphlet contains directions for setting up, some general remarks on concentration and the treatment of slimes, tables showing the specific gravities of various ores, etc. The Bartlett table is stated to have a capacity, when concentrating 8 into 1, of 20 tons in 24 hours.

SPECIAL CORRESPONDENCE

Denver. April 4.

(From Our Special Correspondent.)

It is stated that nearly 2,000 men are already at work, east of the Continental Divide, on the construction of the Denver, Northwestern & Pacific, the new Moffat railroad being built from Denver to Salt Lake City, and several corps of surveyors are busy, west of the Divide, in Grand and Routt counties, determining the exact line of the road. From the 20 miles west of Denver (altitude 5,179 ft.) to Rollinsville (altitude 8,323 ft.) 42 miles from Denver, in northern Gilpin County, there will be 26 tunnels from 150 to 1,700 ft. long. This will be the slowest length of the road to construct. From Rollinsville to the main tunnel, 12,700 ft. long (altitude 10,000 ft.) through the Continental Divide, 60 miles from Denver, the line will more or less follow South Boulder Creek. Pending the completion of the main tunnel, the railroad will cross the Divide near James' Peak, by a "switchback." It is expected that before the end of this year tracks will be completed from Denver, over the Continental Divide, into Grand County, often known as Middle Park.

The road will greatly benefit camps in northern Gilpin County, which have to haul ore and supplies distances of from 12 to 20 miles, across an intervening divide about 10,000 ft. high, and camps in southwestern Boulder County, which have to haul ore and supplies from 20 to 25 miles by wagon road.

The announcement last year of the new railroad led to considerable development work in the above-mentioned camps, but was too late to cause much prospecting on the western side of the Divide in Grand and Routt counties. This season, however, as soon as the snow goes, hundreds of prospecotrs will be busy along the proposed route of the new railroad.

Grand County has heretofore been undeveloped, notwithstanding its comparatively close proximity to Denver and its great resources. Hot Sulphur Springs (altitude 7,715 ft.), the county seat (115 miles from Denver by the new road) will be within 4 hours' ride from Denver, instead of 2 days as now.

Los Angeles, April 1.

(From Our Special Correspondent.)

Henry Packard, manager of the Lower California Development Company, with George P. Brown, of Ensenada, Mex., arrived in Los Angeles on April 1. They report much activity in the mines on the peninsula. Mr. Brown has been appointed manager of the Cedros Island Copper Mine, with instructions to push development. He reports the Santa Teresa Gold Mines, on the mainland, opposite Cedros Island, showing up very nicely, and expects to install a 20-stamp on the property in a short time. The ore shoot is shown for 450 ft. long and 160 ft. deep, with an average vein width of 4 ft. The assay values is $10 per ton.

The deal on the Bagdad group of mines, near Ludlow, is not yet closed, but within the next week probably will be. The ore-body is reported very large, with a milling average to date of over $20 per ton. The new deal comprises the Chase and Bagdad mines, a property owned by New York City and Rochester, N. Y., people. The purchasers are represented by C. A. Molson, John B. Farish and E. A. Wiltsie. Within the week over 60 mining claims have been purchased, surrounding the Bagdad group, by O. P. Posey, Senator Dorsey, Eben Smith and other mining men. So far this important camp is but little known, but hundreds will be going in within the next 30 days.

The miners employed by the German-American Mining Company in the Gold Roads District, Mohave County, Ariz., are on strike, demanding $4 per day. This demand is refused by the operators, and the mine is closed. The mine is at present under bond to Messrs. Posey and Baly, of Los Angeles.

Experts are now examining the Gold Mountain mines owned by Capt. J. R. De La Mar. Whether in the interest of Capt. De La Mar, who contemplated a large mill, or for intending purchasers, is not definitely known. The ore-body is very large, and has been worked as a quarry.

John B. Farish, T. Farish, Fred Farish, G. A. Molson, H. Wilkinson, L. B. Scowden, John Montgomery, O. P. Posey, Eben Smith and Geo. Kislingbury are some of the mining men now interested in the new gold district near Ludlow, Cal.

George Arthur Rice and Wm. Gelder, of New York City, have secured options on a large tract in San Bernardino County, Cal., said to carry nitrate of soda

in extensive beds. The present distance from railroad is 16 miles. The final tests for quality are being determined in a laboratory in this city.

The 5-stamp mill on the Johnson Mine, near Victor, Cal., recently erected by Howland, Werner & Co., of this city, is reported running on $15 rock. A cyanide plant to treat the tailings is under erection.

San Francisco. April 1.

(From Our Special Correspondent.)

The California Mine Operators' Association at the meeting on March 25 elected the following officers: E. C. Voorheis, president; James E. Dye, secretary; Fred W. Bradley, vice-president, and C. M. Belshaw, Ed. H. Benjamin, W. F. Detert, C. R. Downs, J. C. Kemp, Van Ee, David McClure and Jas. H. Mooser, executive committee. A resolution adopted without debate states that the organization believes in the principle of equal rights to all and special privileges to none, and that in the employment of labor it will not discriminate against non-union men.

According to the constitution adopted the objects of the association are to protect, foster and develop the mining industry of California in all its branches. The annual meeting is to be held in San Francisco, beginning the third Wednesday in April. The membership of the association is to consist of individual mine owners, mine managers or superintendents and companies owning or operating mines in the State of California. The membership fee is fixed at $10.

Comparatively few mine operators joined at first, as the mistake was made of calling the first convention only a few days after the decision to hold it, and not one-tenth of the mine operators in the State knew anything about the movement. It must be admitted that the association does not start business under very auspicious circumstances. Everything is left in the hands of the executive committee, and unless this committee is very active and the president and secretary take hold and "rustle" the new organization will hardly exercise much influence.

One of the first results of the forming of the association was the meeting at Jackson, Amador County, of the Mother Lode Miners' Unions, at which the attitude of the Mine Operators' Association was discussed. The delegates decided to demand recognition and an 8-hour day. A secret meeting is to be held and action taken. But this miners' union meeting was not much more enthusiastic than that of the mine operators, and both sides seem somewhat at sea. It is certain, however, that if the Mother Lode miners try to enforce unreasonable demands many mines will close.

A little rioting, mainly in the matter of interference with incoming miners, is going on at Keswick, Shasta County, where the Mountain Copper Company's smelters are situated. A number of strikers who have interfered with non-union men have been arrested, but released on bail.

The whole mountain region of California has had rather an over supply of rain during the week, and some damage has been done at certain points. The precipitation this winter has far exceeded that of several recent seasons, and hydraulic and placer miners, who have had several successive "dry" seasons, expect to make up for lost time. All the reservoirs in the mountains are filled, the ditches are running bank full, and the "giants" are making the gravel fly.

A heavy flow of liquid asphalt is announced from a well at the Casmalia Oil Company's property on the Arrelanes ranch in the northern part of Santa Barbara County. This county has had the only other real liquid asphalt property in the State, though it has been closed down as exhausted.

It is now given out that the Rhodes & Tonopah Railroad will be in operation by September 1. The railroad is to run from Rhodes, on the Carson & Colorado Railroad, direct to Tonopah, Nev. It is stated that ample funds have been supplied.

A bad cave-in has occurred at La Fortuna Mine, near Yuma, Ariz., owned mainly by Charles D. Lane, of San Francisco. The cave began at the 600 level, and destroyed about 200 ft. of shaft, burying considerable high-grade ore. The cave was anticipated, and no one was hurt, but the mill may have to close.

The Southwest Miner's Association of Los Angeles has turned its mineral collection over to the local Chamber of Commerce, which is to devote more attention to mining. Meantime a movement is on foot to organize the South California Miner's Association with initiation fee at $1 and $1 per month dues. It will probably be easy to get the brokers and promoters to assemble, but mineral collections have little to do with attracting people who want to buy mines. Where such enterprises are purely speculative and carried on by men with little or no knowledge of regular mining, more harm than good is done.

San Luis Potosi, Mex. March 31.

(From Our Special Correspondent.)

Parral is again excited over a remarkably rich strike of gold and silver ore in the mines of the Hidalgo Mining Company, of which R. J. Long is superintendent. This is believed by many to be the richest strike ever made in a Mexican mine. Heretofore the gold finds of the district have been in very narrow veins, but this find is claimed to be 5 ft. wide, and to assay as high as 20 oz. in gold and 2,000 to 3,000 oz. in silver.

The rich gold strike continues in the Veta Grande mines, at Minas Nuevas, 10 miles west of Parral, and this property, purchased recently by the Guggenheims for $200,000, is already being rated at $5,000,000, though it is the oldest mine in the district, located in 1,645 on the Veta Colorado, one of the strongest veins in the Republic. On the mines of La Union, Santa Barbara, 12 miles southwest from Parral, the second payment of $350,000, gold, has been made on the price of $1,000,000. The Montezuma Lead Mining Company (branch of the Compania Metalurgica Mexicana) is increasing its power plant and putting in a magnetic separator to handle the zinc middlings, as the work of the company so far has not been entirely satisfactory from lack of power and proper equipment. At the Tecolotes plant, across the gulch from that of the Montezuma, experiments are being made, with a gas generating plant to furnish power and save fuel. This entire Parral district, with its many surrounding camps, and abandoned but still rich mines, presents most attractive opportunities to capitalists who are not afraid of pumping out the old properties.

Robert S. Towne, of New York, president of the Compania Metalurgica Mexicana, is in San Luis Potosi arranging for the vacancies at the company's smelter caused by the resignations of former Superintendent C. M. Van Cleve and Manager A. S. Dwight, both of whom have been at the smelter for two years. Mr. Dwight has gone to New York City to consult over the management of a large property in Sonora, and Mr. Van Cleve leaves soon for Mapimi, Durango, to take the position of superintendent of the smelting plant of the Compania Minera de Penoles. The place of superintendent at San Luis Potosi will be occupied by Mr. Carl Koelle, who is expected on April 15. The position made vacant by Mr. Dwight will not be filled at present, the extra work falling upon Mr. Koelle and Messrs. D. C. Brown and R. L. Kayser. Mr. Towne will remain in Mexico for some time to give personal attention to the smelter, and the San Luis Potosi & Rio Verde Railroad, which the company is building, and also to the work at the famous San Pedro mines, near San Luis Potosi, the lower levels of which are held under lease by the Compania Metalurgica Mexicana, which is doing a gerat deal of prospecting with diamond drills.

Exchange on New York during the week has been very steady at 262½ to 262, closing at the latter figure. Mining stocks have improved all along the line, though the favorites seem to have been Dos Estrellas, of El Oro, selling as high as $2,070, making a valuation of over $6,000,000 for the property, and Santa Maria de la Paz, of Matehuala, selling at $770. The other principal deals were in Monterey Iron and Steel at $126.50; Cinco Senores at $204; Hacienda de la Luz, Pachuca, at $305; San Rafael y Anexas at $1,050; Santa Gertrudis, Pachuca, at $80, and La Blanca at $900.

London. March 28.

(From Our Special Correspondent.)

The Egyptian market, which for the past few weeks has been the center of activity in the mining market, has experienced a rude shock by the refusal of the Egyptian Government to sanction the reconstruction scheme put forward by the Nile Valley Company, As I mentioned last week, the plan was to reconstruct with a capital of £250,000 (the nominal capital now being only £30,000) and to issue 35,000 of the new £1 shares to Mr. J. B. Robinson (of Rand fame) at 30s. each. I have previously pointed out that the Egyptian Government has absolutely refused to allow its territories to become the sport of London speculation; and when first referring to the Egyptian boom some weeks ago, I mentioned that for this reason, if for no other, it was folly to look to Egypt as a hunting ground for the London promoter. Hitherto the Egyptian Government has granted mineral concessions only to companies that can show good credentials and any suspicion of speculative Stock Exchange influences has been an effective check to the success of applications. It is possible that with some modifications, and with personal guarantees, the Nile Valley Company may induce the Government to allow it to take advantage of Mr. Robinson's offer of working capital; but that remains to be seen. While writing on this subject, I should like to point out another source of future trouble in connection with this market. Several of the companies owning concessions have already leased or sold portions to subsidiary companies. It is doubtful whether such proceedings are in conformity with the original agreement with the Government, and buyers of shares should take care to satisfy themselves on this point before plunging into the speculation.

The report of the Exploration Company, Limited, for the year 1902, brings the welcome news that Mr. R. T. Bayliss is succeeding in pulling this company out of the slough that it nearly sunk in two years ago. A profit of £69,558 has been made, and £62,500 is to be distributed as dividends, at the rate of 5 per cent. A year ago the finances of the company were drastically reorganized, and the situation faced bravely. One of the risky assets that was not realizable at the time was the large loan to the French Traction Company. Since then this loan has been reduced from £234,000 to £81,000 by payments in cash and securities. The assets of the Exploration Company still include many investments not immediately realizable, but the worst is over, and the corner has been turned towards prosperity once more. When writing of the position of the company eighteen months ago, I echoed the pessimistic feeling current in London at the time, that the havoc played with its resources by the managers preceding Mr. Bayliss would bring about its extinction. It is a pleasure, therefore, to record the fact that Mr. Bayliss' efforts to put the company on its legs again are succeeding.

An interesting report on the Boston Consolidated Copper and Gold Mining Company by Mr. Ralph Nichols has just been published. This company owns property in Bingham Canyon, Utah, adjoining that of the Utah Consolidated Company. These two companies were introduced at about the same time to English investors, some five or six years ago. The Utah Consolidated property developed so well that American hands were laid on it six months since by the purchase of a controlling interest on behalf of the Amalgamated Copper Company. The Boston property contains large bodies of ore which have been extensively developed, but the tenor in copper and gold is low. The directors have never felt justified in erecting a smelter, and have made extensive investigations into various processes, Mr. Ralph Nichols, who is well known in America—he is at present manager of the Great Boulder Perseverance in West Australia—was commissioned to report on the property in January last. His report confirms the estimate of great bodies of ore blocked out at the various levels. He figures that there are 650,000 tons ready for treatment averaging 3 per cent copper and $1.50 to $2 in gold; and he recommends the erection of a smelter to treat 500 tons a day. He recommends, however, that before definitely accepting this estimate of ore, a number of winzes should be driven between the various levels in order that the existence of the ore between the levels may be more definitely proved. The directors are taking this advice, and after the further exploring work has been done, will recommend certain financial arrangements to provide funds for the smelting works.

The report of the United Alkali Company for the year 1902 shows that in spite of large profits the ordinary shares will once more go without a dividend. The company made a net profit of £369,457, but of this £126,661 went as debenture interest and £186,000 as preference dividend, while the remainder goes to debenture redemption, etc. This is the sixth year in succession that the ordinary shares have had no dividend. The first year of the existence of the company, 1892, yielded 6 per cent, and 1893, 5 per cent, while in 1895 and 1896 the dividends were 1 and 2 per cent, respectively. The 7 per cent preference shares are cumulative, and all dividends have been paid up to date, but that there is some doubts as to their safety as an investment may be judged from the fact that they are quoted at £7, the par value being £10. The United Alkali Company is one of the great English chemical businesses, and was formed by the amalgamation of many businesses of historic fame, such as the Gamblers, Gaskells, Muspratts, McKechnies, etc. At the time of its formation the profits of the various businesses warranted a large nominal capital, though even then it might have been urged that £3,000,000 each in preference and ordinary shares and £3,000,000 in 5 per cent debentures was unwarrantably high in a trade subject to great fluctuations in prices of products. What eventually reduced the profits of the company was the imposition of hostile tariffs in foreign countries. As a matter of fact, every country in the world, of any importance, has a high tariff against the products of the company, and it is quite unlikely that any reduction will ever be made. I have in previous years, when writing of this company, pointed out that the permanent absence of an ordinary dividend is a feature quite out of place in a great industrial concern of this kind, and that, as there is no prospect of circumstances arising to greatly augment the profits, it is absolutely necessary that some rearrangement of capital should be effected. I have in previous years given my opinion that 5 per cent is too high a rate of interest on debentures of this class, and that 4 or 4½ per cent would have been satisfactory to holders of such securities; also that 6 per cent on the cumulative preference shares would have been sufficiently attractive to the investing public. Also in a trading concern of this kind it would have been advisable to have had fewer debentures. Whether an yalteration can be made now depends on the attitude of the various holders. The solution of the problem is a difficult one, and it is easier to say that a rearrangement should be effected than to suggest a method by which it could be done.

Auckland, N. Z. March 4.

(From Our Special Correspondent.)

Hauraki Gold-field.—The production, principally owing to the splendid returns of the Waihi Company, is on the up-grade, the yield for February being about £75,000 ($375,000). The chief contributors were: Waihi, £50,445 ($252,225) from 17,587 tons; N. Z. Crown, £5,945 ($29,725) from 3,008 tons; Talisman, £3,362 ($16,810) from 1,625 tons; Komata Reefs, £4,500 ($22,500) from 1,630 tons; Kauri Freeholds, £3,500 ($17,500), a final clean up; Woodstock, £1,914 ($9,570) from 1,268 tons.

The return from the Kauri Freeholds is a final one, the company, owing to the tenor of the ore being a little below payable, having decided to cease operations. The mine and battery are now being dismantled, and everything sold off.

Diamond Drilling.—Prospecting by diamond drill in Westralia has drawn attention to the subject in New Zealand. One mine, the Woodstock, at Karangahake, is boring for the reef worked by the Crown Company. At the Thames a public company is being formed to carry out a general scheme of drilling in that district. As usual, in the Australasian colonies, Government assistance is sought, and will no doubt be forthcoming. The estimated cost of drilling in this district to a depth of 1,200 ft. is about $2.88 per ft. Deeper holes will cost slightly more.

GENERAL MINING NEWS.

The March record of the Lima and Pennsylvania oil fields shows 988 wells completed, inclusive of 172 dry holes, and a new production of 11,431 bbls., says the Oil City *Derrick*. This was a gain of 43 wells completed, accompanied by a decline of 548 bbls. production and 26 dry holes. Indiana was the only section to show a gain in the new production and wells completed.

On March 31 there were 587 rigs and 1,031 wells drilling in the Trenton Rock and Pennsylvania oil fields, which was a loss of 27 rigs and a gain of five wells drilling, as compared with the figures on the last of February. While the Pennsylvania fields showed increased activity in all sections, the gain was more than offset by the decline in the field work in Northwestern Ohio and Indiana.

ALASKA.

Two new railroads are being promoted for the Yukon country, Alaska. One is to run through 20 miles of the diggings at Tanana, and the other is to be 11 miles long and run from Coal Creek to the Yukon at a point 5 miles below "Forty-Mile." The equipment is to be delivered at the White Pass Railroad, not later than July 15. The 11-mile road is to bring out the product of certain coal properties.

ARIZONA.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Century.—This claim, at Chloride, at the bottom of the 70-ft. shaft, is said to show 30 in. of rich gold ore.

New Comstock Mining Company.—This company, in San Francisco District, 41 miles northwest from Kingman, has attracted renewed attention by getting the Sheeptrail group of mines with the 20-stamp mill, about 6 miles from the Colorado River. In the original property there are 14 claims. The Katherine Mine, on which most of the work has been done, is in Pyramid Canyon, near the Colorado River. The vein outcrops in granite. The ore is a free-milling mixture of quartz and calcite, but occasionally some bunches of silver sulphide are found. The vein at 200 ft. depth is said to be 52 ft. wide, and 25 ft. of this said to yield values from $5 to $50 per ton. A run of 600 tons at the Sheep Trail Mill is reported to have averaged $7.20 per ton by amalgamation. The Sheep Trail group consists of 5 patented claims, not worked for 2 years past. There is a cross-cut tunnel opening the vein at a depth of 800 ft., with upraises and stopes to the surface.

Queen Bee.—This mine, at Mineral Park, under option to Jacob Deter, of Denver, has a shaft 200 ft. deep. A new hoist, using gasoline as fuel, was recently installed.

San Francisco.—J. C. Hess and Fred Reichart are at this claim at Acme, from Bloomsburg, Pa., to start systematic development.

CALIFORNIA.

AMADOR COUNTY.

Argonaut.—It is not expected that work on this mine at Jackson, J. B. Francis superintendent, will be actively worked for some months, as timber and other supplies must be obtained.

Bay State Mining Company.—The 10-stamp mill of this company, at Plymouth, is running steadily under the management of Mr. Worthing.

Kennedy.—Twenty stamps of the mill, at Jackson, have started and are crushing ore from the dumps at the rate of about 4 tons per stamp. The other 20 stamps will soon be ready.

Keystone Consolidated.—It is stated that M. J. Macdonald, owner of this mine, at Amador City, has dispensed with the superintendent, and now has a foreman for mine, mill, store, etc., who reports direct to him at his office in the Mills Building, San Francisco.

Zeila Mining Company.—This company, at Jackson, has started its 40-stamp mill again after several months' suspension. Extensive repairs have been made to the shaft, etc.

CALAVERAS COUNTY.

Blue Jay.—This mine, at Jesus Maria, is operated by the Fannie Marie Mining Company, F. O. Courtmarsh, manager.

Forty-Nine.—At this placer mine, near Douglas Flat, J. M. Evans superintendent, new pumps and hoist are going in.

Gold Hill Consolidated.—John C. Jens has applied for permission to mine by hydraulic process near Esperanza. The mine drains into Calaveras and Esperanza creeks, branches of the Calaveras River.

Gold Standard.—This and the Louisiana mines, near Mokelumne Hill, under bond to J. E. King, are being worked. A tunnel is being run on the lead.

North Eureka.—J. L. Miller has applied for a license to mine by hydraulic process, near Railroad Flat. The mine drains into Spruce Gulch Creek, a branch of the Mokelumne River.

Sheep Ranch.—Mr. Anderson succeeds James Langford as superintendent of this mine, at Sheep Ranch.

FRESNO COUNTY.

Copper King.—It is expected that work will shortly be resumed on this mine, near Clovis, under the management of Mr. Leavitt. There are still a number of unsettled attachments against the property.

INYO COUNTY.

Anvil Springs Mining Company.—This company, of Anvil Springs, F. H. Vahrenkamp manager, is to put up reduction works. Material for a mill and cyanide plant has been shipped in.

Concord Mining Company.—This company, with offices in the Grant Block, Los Angeles, owns a group of claims in Anvil Springs District, and is preparing to put on necessary machinery.

KERN COUNTY.

Bull Run.—The old tunnel of this mine at Isabella, where no work has been done for 25 years past, is being extended by Allison & Gibson.

St. Elmo.—Work has been resumed on this group of mines under Superintendent Toppy Johnson.

Western Exploring Company.—This company owns about 25 claims, including the Zadie, at Indian Creek, about 14 miles from Caliente. A cyanide plant is shortly to be put in. The Zadie is the only mine worked at present.

Yellow Aster Mining and Milling Company.—R. L. Burcham, of Los Angeles, secretary of this company, states that no option on the company's property is held by anyone. Reports have been received in Los Angeles that one W. L. Lay, of Boston, claims to have an option on the property, and is offering the mine for sale in New York. Mr. Burcham states that no such option has been given by the company.

LAKE COUNTY.

(From Our Special Correspondent.)

Baker Quicksilver Mining Company.—This company, at Lakeport, intends putting up a 10-ton furnace this season.

LOS ANGELES COUNTY.

California Development and Exchange Company.—This is another company formed to erect a smelter near Los Angeles. A. E. Clark is president, and G. O. Pearce, E. D. Bryant, John Binney, H. H. Sheffield, W. J. Bryant and J. M. Cumming are interested. The smelter is to be at San Pedro.

MADERA COUNTY.

Texas Flat Mining Company.—This company has purchased electric generators to be installed about 3 miles from the mine at Coarse Gold, to operate a 20-stamp mill, hoist, etc. J. J. McLelan is superintendent.

MARIPOSA COUNTY.

Hite.—This mine, near Jerseydale, recently bought by Thomas Churchill, has been leased to Arkell Brothers, and 5 stamps of the mill are dropping.

Mary Harrison.—Work under the leasing system is to stop at this mine, near Coulterville, owned by the Mariposa Commercial and Mining Company. C. C. Derby is manager.

McCarthy & Soderberg.—Six stamps are to be added to the 4-stamp mill at Kinsley.

NEVADA COUNTY.

Polar Star.—At this mine, near Grass Valley, Jas. McCaffrey superintendent, a new plant is to be put up under plans of George A. Nihell. J. A. Kerby, of Salt Lake, Utah, is largely interested. A hoist, boiler, engines, etc., will be erected, and a Worthington pump put in.

Posey.—At this mine, near Nevada City, Mr. Bray, superintendent, much development has been done in the past two years. Twelve men are employed. The mine is fully equipped with machinery. A compressor has lately been installed with 3 Leyner drills. A 5-stamp mill will be built.

PLACER COUNTY.

Blue Canyon Mining Company.—This company, at Blue Canyon, J. B. Knapp secretary, is to extend the Azalea Tunnel 400 ft.

Dardanelles.—At this mine, operated by an Eastern company, miners are ground sluicing. A recent storm did some damage.

Gaylord.—This mine, at Auburn, has about 35 men at work. Cement gravel is crushed.

Gold Blossom.—Work has stopped on this mine, pending a new deal for the property.

Three Stars.—At this mine, E. J. Kendall superintendent, 65 men are running a drift on the 700-ft. level to connect with the Belmont. Work is being pushed on all the levels.

SAN BENITO COUNTY.

New Idria.—At this mine, at New Idria, B. M. Newcomb general manager, an electric light plant has been put in, water power being obtained from the mountains. Many improvements have been made since the mine came into the hands of the present owners.

Stayton.—At these quicksilver mines, near Hollister, a large force is employed. A furnace will shortly be erected.

SAN DIEGO COUNTY.

High Peak.—This, the Washington and a few other mines at Julian, are worked, but the camp is rather dull, many claims waiting for the building of the smelter before resuming work.

SHASTA COUNTY.

Balaklala.—At this copper mine, quite a large force is employed by the Pittsburg, Pa., men who hold the bond.

Great Western Mining Company.—James J. Chambers, manager of this company, at Redding, has resigned, and it is thought that W. G. Scott, superintendent of the Afterthought Mine, one of the Great Western's properties, will be appointed in his stead.

SIERRA COUNTY.

Tabor.—After 2 years' work A. I. Eaton and others of San Jose have struck blue gravel in this mine, near Gibsonville. The mine was opened over 30 years ago, but was some time idle.

SISKIYOU COUNTY.

Dewey.—At this quartz mine, near Gazelle, the coarse quartz is crushed in a 10-stamp mill, and the fine quartz and tailings are treated by cyanide.

Golden Eagle.—This quartz mine, near Quartz Valley, is to start up again. The mine was a large producer years ago.

Hawkinsville Dredger.—This dredger was thrown to one side b ya recent freshet, and men are getting it into deep water again.

Morrison & Carlock.—The buildings and hoisting works of this mine at Quartz Valley are being replaced. The fire caused considerable loss.

Willard Eastlick.—The Tacoma, Wash., company, M. Geary superintendent, which recently bought this ledge near Oro Fino, will soon have men sinking. The ledge is about 7 ft. thick.

TEHAMA COUNTY.

(From Our Special Correspondent.)

Basler.—Work continues on this mine in the coast range, near Lowerys. The tunnel is in 400 ft.

TRINITY COUNTY.

Fairview.—At this mine, near Minersville, J. H. Porter superintendent, stoping has started in tunnel No. 3, where a 3-ft. ledge of good ore has been found.

Quimby.—This mine, at New River, recently sold by W. R. Beale to Spokane, Wash., men, is being developed under Mr. Beale, superintendent. Part of the material had to be packed on mules for about 60 miles, but a wagon road will be built this spring.

COLORADO.

The Legislature has adjourned without taking action on the 8-hour bill.

GILPIN COUNTY.

(From Our Special Correspondent.)

McFarlane & Co., of Central City, Black Hawk and Denver, shipped from their Black Hawk foundry during the past week copper concentrating tables and other milling supplies to Strong & Trowbridge, of New York City, for reshipment to Melbourne, Australia.

Gilpin County Ore Shipments.—The shipments of smelting and crude ores, tailings and concentrates from Black Hawk to valley smelters and other outside points (principally Idaho Springs) in March were 298 cars, or 5,960 tons. The shipments were below the average. A smelter at Golden was idle and did not receive ores except from the Saratoga

property in this county, and the latter ores are being piled up for future treatment. Repairs are given as one reason for the temporary closing of this plant, although labor troubles were also a factor. The suspension has been a handicap to many Gilpin County shippers, who got much better results from that smelter than by amalgamation. In the last half of the month heavy snowstorms demoralized the hauling of ores.

Ann Rutledge Mining Company.—The North Star, or main shaft, is down 225 ft., and will be sunk at least to 400 ft. The shaft bottom shows a crevice with lead and iron sulphides, and in 2 drifts some good ores average between $16 and $51 per ton, while the average of 6 ft. of mill ore will go better than $6 per ton. J. McMillen, of Central City, is superintendent.

Eureka.—Ex-Mayor Jenkins and a local pool have resumed work on this property in Prosser Gulch, and will soon begin work, taking out the water which stands 65 ft. below the collar of the shaft. This shaft was formerly sunk several hundred feet, with the view of its being the Gilpin County terminus of the great Newhouse Tunnel. John Hansen, Central City, will look after developments.

Fairfield Gold Mining Company.—Baltimore, O., men are interested in a lease and bond. The March product was 3 cars of smelting ores, which brought $125 per ton, and about 20 cords of milling ore, averaging 3 oz. gold per ton, besides a good tonnage of tailings. W. M. Nickerson, Central City, is manager.

Oro Verde Mining and Milling Company.—This company at Yankee, 10 miles west of Central City, will erect its own mill during the coming summer, and also install a large air compressor. Recent developments have opened an 18-ft. ore-body. G. P. Goodier, of Yankee, is manager.

Yankee Consolidated Mining, Milling and Tunneling Company.—Manager H. I. Seemann, of the Equitable Building, Denver, says that the company will start work on its 50-ton mill at Yankee property before April 15. The company will soon begin to take out ores from its lower Lombard tunnel, so as to have a large supply on hand, and has started a 2-compartment shaft on the Lombard, where it will install machinery during the summer.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

A marked revival in the iron market has started many leases that have been idle for some months. Every iron property that has material that will stand a fair treatment charge is shipping.

Bartlett.—The tunnel is in about 800 ft., and is cutting several of the rich veins of the Sugar Loaf. The tunnel will be pushed to 1,200 ft.

Belgian-Frenchman Company.—Some work is being done through the old Belgian workings, and arrangements are being made to work on a large scale.

Breece Hill Mill.—This new mill is to treat by cyanide the very low-grade siliceous ores of the gold belt. It has a capacity of 60 tons daily, and if successful will be enlarged. The machinery is just being put in.

Boulder Mining Company.—This new shaft on the White Cloud, when down a little over 400 ft., encountered a heavy rush of water that rose to the drainage tunnel, within 43 ft. of the collar of the shaft. Manager Timothy Kyle will put in 2 100-h.p. boilers and 2 pumps of 1,000 gals. capacity each.

Coronado.—The pumps have been started by the Midas-Coronado combination, and connections will be made with the Midas. A large low-grade iron shoot is opened.

Corona Mining Company.—This property, a fraction adjoining the A. Y. & Minnie, has opened ore, presumably an extension of the Minnie, and is arranging for regular shipments.

Gold Basin Mining Company.—The vein has been followed over 150 ft., and another rich shipment made. The stuff runs 2 to 4 oz. gold, but the vein does not widen.

Helen Gould.—Work resumes under direction of M. Mankuss. The tunnel is in 300 ft., and the main drift 190 ft. A vein showing high-grade values is being developed.

La Belle Mining Company.—This lease on the end of the Black Prince has opened a good ore-body, and begun shipments.

Matchless.—Several new leasers have started work, and are taking out about 75 tons iron per day from above water level.

New Leadville Home Mining Company.—At the annual meeting directors and officers elected for the ensuing year were: E. J. McCarty, president and treasurer; W. K. Burchinell, vice-president; W. A. Moore, secretary; J. M. Maxwell, Henry Gaw, A. Lumsden, John Law and D. D. Sullivan. The annual report showed receipts from all sources of $167,337; expenditures, $166,930. During the year the company mined, in round numbers, 46,000 tons of iron ore, netting approximately $115,000 from these claims: Penrose, 17,000; Alice, 25,000; Estrella, 16,000; G. E. P., 1,500; Orion, 500, and Home and Fraction, 500. The manager's report showed that since money was raised for development, 2,500 ft. of drifting and upraising have been done and 12,000 tons of iron ore shipped; 450 gals. of water a minute are handled. Large bodies of siliceous low-grade ore have been opened in addition to a fine lead ore. The property is shipping 200 tons daily.

Resurrection Gold Mining Company.—The output is 100 tons a day. The screens in the new mill have been changed, is handling 140 tons of crude ore daily. crude ore.

Valentine Mining Company.—Diamond drill work has started and indications point to the upraise approaching an ore-body.

Valley Mining and Leasing Company.—Several car-loads of ore have been shipped. Sinking has been resumed.

Yak Mining, Milling and Tunnel Company.—The tunnel has connected with Ibex No. 4 shaft by a drill hole. The shaft will be sunk at once. The tunnel is in 11,000 ft., and the breast is 1,300 ft. from surface. The tunnel has cost $800,000, most of the work having been done the past 6 years. Some ore has been taken out as work progressed. Aug. R. Meyer, of Kansas City, is the president of the Yak and W. W. Davis, of Leadville, vice-president and general manager.

SAN MIGUEL COUNTY.

(*From Our Special Correspondent.*)

Alta Mines Company.—The machinery for the new 100-ton mill, in Turkey Creek Basin, is being hauled in, and the plant will probably be ready May 1. It will have 20 stamps, a Huntington mill for re-grinding the ore, and vanners and concentrators. The Alta group has been under steady development, and large areas of ore are reported blocked out. The ore runs in gold, silver and lead, and the new plant was designed especially for its treatment. N. T. Mansfield, of Telluride, is resident manager. He and his associates sold the Alta group to the present company.

Butterfly-Terrible Gold Mining Company.—The east drift from the 2,000-ft. cross-cut has been driven between 400 and 500 ft. on the Ida vein through ore which will average $20 per ton in gold, almost wholly free milling. Only 15 stamps of the mill are dropping, owing to the scarcity of water, but in a few weeks the entire 30 will be dropping. Hiram Bullock, of Denver, is manager.

San Miguel Consolidated Mining Company.—This company has resumed treating ore from the Nellie and Ella mines, in Bear Creek, at the Bear Creek 120-stamp mill. Only 40 stamps are dropping, handling about 120 tons every 24 hours. The product runs almost exclusively in gold and yields from $15 to $25 to the ton. The tramway and mill have been idle about 4 weeks, a part of the former having been taken out by a snowslide, and both have been thoroughly overhauled. Cooper Anderson, of Telluride, is manager.

Smuggler-Union Mining Company.—O. B. Kemp, of Telluride, general superintendent, has recently granted a lease on the larger part of the old workings, and a large bloc kof new ground in the Sheridan Mine on the same vein and adjoining the Smuggler on the north, to 6 miners, including Thomas Elliott, foreman of the Smuggler Mill; George Waring, formerly foreman of the Smuggler-Union mines, and William Brennan, an old leaser on the Sheridan. The lessees have been taking out a lot of ore for a preliminary run at the Smuggler Mill, and if results are satisfactory they will soon have 100 men working. The values are about evenly divided in gold and silver. During the summer for a number of years the Smuggler-Union Company has been working over the low-grade ore in the Sheridan dumps, but these are now about exhausted. The ore will go to the mill over the company's tramway.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Millmen's Strike.—The settlement of the strike makes everything look brighter in the Cripple Creek District. A number of these mines have resumed work, and others will resume soon, among them the Isabella. The Independence and the Elkton are busy while the Gold King and the Golden Cycle are expected to be soon. The settlement is a matter of congratulation, as a general strike would probably have resulted in a complete tie-up for a long time.

Acacia Gold Mining Company.—The dividend recently declared of 1c., or $14,339, has been paid. The company has been doing fairly well, and has some money left in the treasury. Some ore is being shipped from the Burns Claim and from the Morning Star. The property is being worked under lease.

Cripple Creek Drainage Tunnel.—Work is being pushed, and it looks as the tunnel would be finished before the time called for by the contract. In March the 3 headings were down 746 ft., an average of about 25 ft. per day. By working in all the headings at once an average of 30 ft. per day can be made.

Cripple Creek Enterprise Gold Mining Company.—A contract has been let for considerable drifting at the bottom of the 200-ft. shaft at the corner of Fourth Street and Myers Avenue, Cripple Creek. The company is a St. Louis concern, which has a franchise to mine ore under certain streets and alleys. Dan Hanley has charge.

Globe Mining and Reduction Company.—This company has taken over the Van Fleet Sampler at Gold Fields and is remodeling it into a 100-ton cyanide mill to treat the ores from the Iron Clad group. The work is under the direction of C. T. Durell, a Montana mine manager and cyanide man.

Mary McKinney Mining Company.—The directors have declared the usual quarterly dividend of 1c. per share, or $30,000. The mine is one of the best in the district, and has been a steady shipper. It is on Guyot Hill, near Anaconda. George L. Keener, of Cripple Creek, is general manager.

IDAHO.

BLAINE COUNTY.

Della Mountain Company.—At this company's mines, near Hailey, the tunnel is in 1,400 ft., with 500 ft. additional to drive to tap the vein. Three shifts are driving it by hand, averaging 100 ft. per month. S. Allen is manager.

Fourth of July Mining and Milling Company.—This company has been incorporated to work the Fourth of July group of claims near Hailey. The directors are: M. S. Tustin, B. Cooley, L. Yancey, F. Meyn, B. M. Whisner, W. A. Weston and J. W. Ferguson.

BOISE COUNTY.

Edna.—A one-half interest in this group of quartz claims, near Idaho City, has been sold to the California Mines Corporation for $10,000. On the Edna a tunnel has been run 1,200 ft., gaining a depth of 340 ft. A raise extends from the tunnel to the surface. The pay shoot has been followed 200 ft., the average width of the ledge being 5 ft. The 5-stamp mill on the Edna will be replaced next summer by 20 stamps.

CUSTER COUNTY.

Lost Packer Mining Company.—Manager J. Czizek, of this company, operating the Lost Packer Mine, near Custer, is to install a 5-stamp mill shortly. The mill will have to be packed a distance of 18 miles.

White Knob Copper Company.—According to reports the smelter at Mackay has resumed operations, and will handle between 250 and 500 tons of ore per day. A tunnel 300 ft. long has been driven into the property connecting with a shaft 700 ft. in depth. An electric railroad of 10 miles carries the ore from the mine to the smelter. About 50 men are employed in the mine. A new 4-drill compressor is in use, pending the arrival of a 10-drill compressor.

IDAHO COUNTY.

Big Buffalo.—This mine, in the Buffalo Hump District, has closed down indefinitely. It is stated that the lack of wood is the cause, but it is reported that the ore bodies mined are practically exhausted. For over two years the 65-ft. level had been steadily supplying a 10-stamp mill, and during this time the output has been from $7,000 to $10,000 per month. A piece of ground 50 ft. wide by 200 ft. long has been mined. On the 200-ft. level the ore is said to carry lower values, but the ledge is very wide. It is now necessary for the company to begin work on the lower levels.

(*From Our Special Correspondent.*)

Crooked River Mining and Milling Company.—This company has placed an order with the Allis-Chalmers Company for 40 more stamps for the 20-stamp mill erected last season. Development, carried on all winter by 2 tunnels, has placed, it is estimated, sufficient ore in sight to keep 60 stamps dropping for a long time. The assay value of the ore exposed warrants the belief that the plating value will exceed $5 per ton. The ore seems to improve in milling value with depth on the felsite dyke. The 20-stamp mill, while it was operated last fall, gave a plating value slightly better than $2.50 per ton, with less than 20c. per ton in the tailings. The 40 new stamps will weigh 850 lbs. each, and have an increased drop. The new mill is to be delivered in June, and will be taken in during the good wagon hauling. The property is about 62 miles from the end of the Northern Pacific Railroad at Stites, and comprises several hundred acres of quartz and placer claims. The water power available is reported sufficient to run 200 stamps or more. This is taken from the Crooked River, the company getting a fall of 300 ft. through a mile of flume and pipe.

LEMHI COUNTY.

(*From Our Special Correspondent.*)

American Developing and Mining Company.—The report of Fred W. Bacorn, receiver for this company in the suit wherein Livingston Cushing is plaintiff, before the United States Court, has been filed. The report covers a period of 18 months, and shows a

profit of $10,720. Following the submission of the report Forbis and Evans, attorney for the receiver, asked the court to close up the receivership by making a final decree in the case. This may be done.

OWYHEE COUNTY.

Banner, Ontario and Tip Top.—These mines were recently sold to G. W. Venable, of New York City, for the Tip Top Mining Company. The three groups are west of Silver City, on Florida Mountain, and west of the Trade Dollar Company's mines.

ILLINOIS.

LIVINGSTON COUNTY.

Cardiff.—This coal mine at Cardiff, owned by the Whitebreast Coal Company, is reported closed and abandoned. Recently a fire caused an explosion, and 9 miners were suffocated. State Mine Inspector Rutledge, in reporting on the explosion, recommended the use of self-closing machine doors in coal mines in place of wooden doors worked by trapper boys. The machine doors would not be torn out by an explosion and closing promptly, would preserve the mine ventilation.

INDIANA.

Coal Miners' Strike.—It is stated that the strike of the miners in the bituminous district is practically settled. The terms of the agreement are not given out.

IOWA.

Coal Miners' Wages.—The miners and operators have agreed on a scale of wages for the year ending April 1, 1904. The wages for day labor are: Box men and top men, $1.80 per day; outside drivers and mine teamsters, $1.80; sinkers, per 8-hour day, $2.70; pipe men, $2.50; drivers and trip riders and cagers, $2.44; oilers and trappers, $1.13; pushers and all inside adult labor not otherwise specified, $2.36. The price in the first district for screened lump coal is $1.65; in the second district, 95c.; in the third district, $1, and in the fourth district, $1.10 per ton.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Copper Shipments.—Refined copper is beginning to accumulate. A considerable quantity is stored at the Dollar Bay, Quincy and Calumet & Hecla smelters, awaiting the opening of navigation. The stock of refined metal, however, is smaller than is usual on hand at this season, and the first few vessels will clean up the supply.

Atlantic.—The March production was 302¾ tons of mineral.

Baltic.—This mine produced 674 tons of mineral in March, the largest output of any month since the mine was opened. Four stamps were in commission, one more than during the previous month.

Champion.—The output for March was 582 tons of mineral. Sixty tons of mass and barrel copper were secured.

Copper Range Railroad.—A regular freight service between Calumet and Houghton has been established on the northern extension.

Franklin.—The production in March was 382¾ tons of mineral.

Osceola Consolidated.—Capt. Probe Richards has been appointed head mining captain.

Quincy.—The output for March was 1,056 1-5 tons of mineral. No. 8 shaft on the Mesnard property is down 2,250 ft.

Rhode Island.—The cross-cut west from No. 2 shaft at the 8th level has cut the West lode, which has been opened for 65 ft. Considerable mass and barrel copper has been taken out. Thirty men are employed.

Tamarack.—Enos Harrold, formerly assistant instructor in mechanical engineering at the Michigan College of Mines, has been appointed assistant superintendent of the Tamarack and Osceola stamp mills.

Trimountain.—No. 1 shaft is sinking below the 10th level, No. 2 below the 9th and No. 3 has reached the 3d level. A temporary shaft house is being erected, and the old hoist at No. 1 shaft will be moved over and used.

Winona.—This mine produced 71¾ tons of mineral in March with one stamp at the Atlantic Mill in commission.

Wolverine.—This mine produced 513¾ tons of mineral in March.

COPPER—KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Miskwabik Development.—This company will start exploring its property 5 miles north of the Mohawk Mine next week, weather permitting.

Mohawk.—The output for March was 397 tons of mineral, from 2 stamps working 26 days.

COPPER—ONTONAGON COUNTY.

(*From Our Special Correspondent.*)

Adventure Consolidated.—Capt. William Skewes, formerly of the North Kearsarge, has been appointed head mining captain, succeeding Capt. Thomas Cocking.

Mass Consolidated.—This company has 10 more drills in commission on the Evergreen lode. Opening work will be rushed, and the 2d head at the mill will be used as soon as sufficient ground is opened. Shaft A is down to the 12th level. Drifting west is under way at the 9th, 10th and 11th levels. The Butler lode has been opened in B shaft at the 6th and 7th levels.

Michigan.—This company will soon construct permanent shaft and rock houses at A and B shafts to replace the temporary structures now in use. Oregon fir will be used. Cross-cutting from the 12th level is under way for the Branch vein and the Minnesota lode. Work on the steel engine and compressor house is about completed. The machinery will be installed at once.

MINNESOTA.

(*From Our Special Correspondent.*)

Ore from the mines at Ely and Soudan on the Vermilion Range, and from the Genoa, Fayal, Hibbing group and Adams, on the Mesabi Range, is being shipped to docks at Duluth, Two Harbors and Superior. The docks will soon be full, and vessels are expected. All ores shipped are from mines whose stock piles are crowded, and can hold no more. No freight rates have been established, and the Pittsburg Steamship Company will move its ships regardless of any vessel owners' organization.

Boston & Duluth Farm Land Company.—This company, which is a large owner of land on what is called the Highland Range, back of Duluth, is to put in a drill. Three or four churn drills are working on lands on the range. Nothing of any value has been found.

East Biwabik Mining Company.—Messrs. Hubbell, Merritt et al. have organized this company, and bought of Alfred and L. Merritt an exploration in section 2, T. 58, R. 16, which shows a shallow deposit ore-body in 2 holes.

Most of the work under way on T. 59, R. 14, has stopped, and nearly all the drills have been taken elsewhere. Very little of value has been found, the ore being mostly mixed and lean.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

Corrigan, McKinney & Co.—This firm has taken assignments of State lease in section 16, T. 57, R. 21, where there is a possibility of ore.

Duluth.—This mine, which ships to Jones & Laughlins, is to double its force, and will mine heavily this summer. It has been stripping all winter, and the product from the shafts has been unusually light.

Leonard.—Stripping contracts have been let to Drake, Stratton & Co. for 2,000,000 cub. yds., of which 300,000 yds. will be moved this year. The stripping is about 60 ft. deep, and the ore will be milled. A shaft is now going down. Machinery has been bought from the Lake Shore Engine Works, of Marquette, Mich.

Stripping Contracts.—Drake, Stratton & Co. have work at the Leonard and Crosby, new mines, and at the Fayal, Stevenson and Sharon, old mines, and will employ about 900 men this year. Stripping at the Stephens, Biwabik and Adams, Duluth, Mountain Iron and Mahoning is done by the owners; at the Kinney, Morris and Day, Morrow, Cypress, Leetonia, La Rue, Hawkins, Croxton and some others, by various contractors.

Webb.—W. P. Snyder & Co., who last August bought this property in section 5, T. 57, R. 20, will probably open the tract for mining. It will be an underground property, much of the ore lying under a considerable thickness of rock.

MONTANA.

CASCADE COUNTY.

(*From Our Special Correspondent.*)

Cottonwood Coal Company.—This company, owned and controlled by the Great Northern Railway, has added to its holding of coal land near Stockett by the purchase of 1,000 acres. Most of the product of the Cottonwood mines is used by the railway on its locomotives.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Gold Mountain Mining Company.—The appeal in the case of Thomas Cain against this company was argued in the State Supreme Couprt March 20. Cain sues for $20,000 damages for injuries received at the Ruby Mine. The case was tried in Boulder, where plaintiff received a verdict for $2,500. W. A. Clark is the principal owner of the mine, and the real defendant to the suit.

Golden Sunlight.—Fred W. Bacorn, receiver for the American Developing and Mining Company, the owner of this group of mines, has filed his report with the United States Court at Butte. The report covers about 18 months, and shows a profit from the operations of $27,630. Livingston Cushing is the plaintiff to the suit against the company. There is $1,743 in the hands of the receiver, and there is due him as salary $4,421.

MISSOULA COUNTY.

Tarbox.—A strike of silver-lead ore 8 ft. wide is reported in a 200-ft. draft from the bottom of a 225-ft. shaft at this property near Saltese.

(*From Our Special Correspondent.*)

Bitter Root Copper Mining Company.—This property, near Saltees, on the Coeur d'Alene branch of the Northern Pacific Railroad, was recently equipped with a 50-h.p. hoist, boiler and cages for the 2-compartment shaft. It is claimed the Manatoba men are furnishing the means to explore the property. Howard Welch, State inspector of coal mines, is in charge of the work.

Clark's Fork Gold Mining Company.—A reorganization of this company has taken place with the election of Ferdinand Leutz, of Bismarck, N. D., president, and T. S. Letterman, of Missoula, manager. The attachments placed on the property have been removed. The property is near Plains.

SILVER BOW COUNTY.

(*From Our Special Correspondent.*)

Jennie Dell Mining Company.—The shaft on this company's property is down 800 ft. The company was organized to work the Jennie Dell and October quartz claims on the southwest trend of the Rainbow mineral belt, and has the west extension of the Evaline, which produced about $500,000 in gold and silver from its workings above the 350-ft. level. At 300 ft. the ore shoot pitched out of the Evaline into Jennie Dell ground. This company will sink the shaft another 150 ft., making the depth 450 ft., and giving 150 ft. of stoping ground. Machinery capable of sinking 600 ft. has been installed.

Speculator.—This property is again in full operation with 300 miners busy. The injunction secured by Lee Mantle last August was recently dissolved by the State Supreme Court, the court upholding the contention of the Largey Estate lawyers that Mantle had slept on any rights he may have had.

NEVADA.

(*From Our Special Correspondent.*)

The new 8-hour law for miners, adopted by the Legislature, goes into effect on April 25, and has already been put into operation at some of the mines.

OHIO.

Coal Miners' Wages.—The miners in the fifth district, including Belmont, Harrison and Jefferson counties have secured an advance of 5 to 7c. per day for outside men, besides the 12½ per cent increase granted by the Indianapolis convention.

OREGON.

BAKER COUNTY.

Columbia.—The shaft of this mine at Sumpter that caved in recently has been repaired, and is being pumped out. Ore to keep the mill running has come from the tunnel workings.

Emma.—A gasoline hoist, recently purchased, is being installed at the end of the 700-ft. tunnel in this property east of Baker City. W. L. Venson is manager.

Pacific Gold Mining Company.—This company, of Boston, Mass., has been organized to develop the Kentucky group of claims in the Bonanza District, near Sumpter, in Westfall Basin. W. E. Hurd is manager.

Sumpter Smelter.—The machinery for this plant at Sumpter has been received and is being installed.

GRANT COUNTY.

Blue Bird.—This mine, near the Red Boy at Granite, is owned by the New York & Oregon Gold Mines Company. A compressor has been installed, and it is said that a mill will be erected.

JOSEPHINE COUNTY.

Golden Drift Mining Company.—This company has moved its sawmill near the dam being built across the Rogue River, at the Dry Diggings, near Grant's Pass. The dam will soon be finished, after which machinery will be installed. The company has had 2 giants at work in the diggings, using water from Jones Creek.

Oro Fino.—This mine, in Jump-off-Joe District, near Merlin, is to be opened this spring, and a mill installed during the summer.

PENNSYLVANIA.

ANTHRACITE COAL.

There is considerable friction in the anthracite region between operators and miners over the awards of the Anthracite Strike Commission. Many local lodges are not satisfied with the awards, but the principal cause of trouble is as to what shall constitute a 9-hour day, and whether the men shall work over-time or not. Generally, the miners are said to favor working over-time, but the breaker boys and mule drivers do not care to.

BITUMINOUS COAL.

Kiskiminetas Coal Company.—This company is hoisting from its new mine at Tunnelton between 800 and 1,000 tons of coal daily. The mine is equipped with an electric haulage system and lighting plant.

Sackett Coke Company.—This company, composed of Fayette County men, will apply for a charter. The capital stock is $115,000, and the directors are William W. Parshall, of Uniontown; Hugh R. Sackett, Ross F. Hodges and Adolph A. Eberhart, of Smithfield, and William J. Lyons, of Gans. The company has 160 acres of coal lands and about 225 acres of surface in Springhill Township.

Somerset Coal Company.—The Consolidated Coal Company recently granted its miners in Maryland and Pennsylvania an increase in wages of 18 per cent, from April 1. The increase was entirely voluntary. The Merchants Coal Company, the American Coal Company, the Black-Sheridan Wilson Company, and W. K. Niver are parties to the agreement.

Tub Run Coal Company.—This company, recently organized at Uniontown, has purchased 1,200 acres of coal and timber land lying near the mouth of the Tub Run River in Henry Clay township. The company expects to be shipping coal by May 1. The officers are: President, R. E. Umbel; vice-president, H. M. Kephart; secretary and treasurer, W. E. Crow.

Union Coke Company.—This company is to develop coal lands in the Connellsville District for the Republic Iron and Steel Company, and the Cherry Valley Iron Company, and will erect 400 coke ovens. The organizers are: Alexis W. Thompson, president of the Republic Company; Joshua W. Rhodes, president of the Cherry Valley Company; Edwin L. Ohl, a director of the Republic Company, and Wayne Wills. The Republic Company's coke properties now include the Connellsville coke works, at Nicholson, Pa., and the Pioneer coke ovens at Thomas, Ala., while its coal properties are, in part: Springfield Mine, Springfield, Ill.; Sayreton Mine, Thompson Mine and Warner Mine, near Birmingham, Ala.; Woodside Mine, Nicholson, Pa.

United Coal Company.—This company is completing its shaft on the Gardner Farm, near Greensburg, and the line is being run for a new railroad to that point. The new shaft will have a daily capacity of 8,000 tons of coal.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Clara Belle Mining Company.—Sinking has been resumed, and the Tremain quartz mill will start work. A new perpendicular shaft has been sunk 185 ft., and equipped with the hoist purchased of the Edna Mining Company at Deadwood. Two pumps keep the water down.

Grantz Gold Mining Company.—Drifting has started on the 200-ft. level at the St. Elmo Mine.

London & Dakota Mining and Smelting Company.—This company organized in London, Eng., is capitalized at $1,000,000, the stock being in $10 shares. The directors are W. E. Mason, Chicago; Roland A. Hastings, Charles Robinson, Anthony Gibbs, London; Frank W. Lawson, Boston; W. W. Wright, M. A. Willis, Custer. Charles P. T. Colmey, of London, recently completed the purchase of the property. Sir James Francis Whitley is president; T. W. Delicate, Custer, vice-president; E. L. Grantham, Custer, secretary; Charles P. T. Colmey, treasurer.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Homestake Mining Company.—Richard Blackstone, who has been chief engineer for the company, is now assistant superintendent as well.

Horseshoe Mining Company.—W. L. McLaughlin, of Deadwood, is now manager of the company, and has resumed work at the Lucile Mine, shipping the ore to Denver and Omaha.

Lexington Hill Gold Mining Company.—This company, recently incorporated, has purchased the property of the Black Hills & Denver Company, and enough outlying ground to give it nearly 400 acres 2 miles from Deadwood. There is a 50-ton cyanide plant on the ground, and a new 200-ton plant is to be built.

Penobscot Mining Company.—The 200-ton cyanide plant is running steadily, and 25 tons of ore are shipped daily to smelters in Denver. The smelting ore recently discovered, is said to assay $50 a ton. Alexander Maitland, of Negaunee, Mich., is president, and F. R. Byrns, Deadwood, manager.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Rapid River Placers.—The various placer companies are beginning work. There are 4 plants near Pactola, all of which were installed last summer, although it was demonstrated that the ground would pay handsomely. They consist of large centrifugal pumps, conveyors and sluice boxes. E. P. Richards, of New York, at the head of one of the companies, is preparing to install a system of cyanide tanks to treat the black sand found in the placer deposits.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—For the week ending April 3 the banks of Salt Lake City report the following settlements: American Smelting and Refining Company, bullion, $163,300; gold, silver, lead and copper ores, $208,900; gold bars, $41,640; making a total of $413,840.

BEAVER COUNTY.

(From Our Special Correspondent.)

Milford Shipments.—For the week ending April 3, the sampler reports the following shipment: Wild Bill, 1 car ore.

Majestic.—Work on the new smelter is progressing rapidly.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—For the week ending April 3 the samplers of the valley report the following receipts: Mammoth, 16 cars; Bullion-Beck, 5 cars; Gemini, 7 cars; Grand Central, 34 cars; Victor Consolidated, 6 cars; Martha Washington, 1 car; United Sunbeam, 2 cars.

Victor Consolidated.—This company has contracted to ship its ore to the Bingham Consolidated Smelter.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

For the week ending April 3 the amount of bullion sent East by the United States Smelter was 181,798 lbs.; by the Highland Boy Smelter, 300,000 lbs., and by the Bingham Consolidated Smelter, 180,000 lbs., making a total of 661,798 lbs. of copper, lead and silver bullion.

Bingham Shipments.—For the week ending April 3, the following shipments were received by the sampler: Montezuma, 1 car; Columbia, 1 car; Dalton & Lark, 1 car.

Proposed Iron Ore Furnace.—It is rumored that certain Salt Lake City men may erect a furnace on the banks of the Jordan River to handle iron ore from Iron County.

Yampa.—J. M. Callow has men engaged on designs for the new smelter at Bingham.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—For the week ending April 3 the receipts at the Mackintosh Sampler were: Daly West, 2,932,320 lbs. ore; Daly-Judge, 444,580 lbs. ore; Ontario, 115,640 lbs. ore.

Daly West.—The output for March was 14,000,000 lbs. of crude ore and concentrates, for which about $200,000 were received.

New York Bonanza.—The new hoist is in working order and sinking from the 200-ft. level is in progress.

Silver King.—A dividend of $100,000 will be paid April 10.

California.—A new hoist has been purchased.

TOOELE COUNTY.

(From Our Special Correspondent.)

Fish Springs Shipments.—For the week ending April 3 the shipment reported was 1 car of ore from the Galena Mine.

Stockton Shipments.—During the week ending April 3 was reported 6 cars of concentrates from the Ophir Hill Mine.

WEST VIRGINIA.

HARRISON COUNTY.

James & Adams, of Cumberland, Md., have bought 1,400 acres of coal land for a reported price of $210,000 from G. B. Hetzel, James Jones and Louis Scott.

MINGO COUNTY.

Pittsburg & Tidewater Coal Company.—This company has been organized to mine bituminous coal for export trade. The capital of the new company is $1,500,000, and it has 24,000 acres of land in the town of Dingess, on the line of the Norfolk & Western Railroad. Five mines are now in operation on the property. The officers are: Edwin Ripley, Sherman, N. Y., president; C. K. Totten, Pittsburg, Pa., vice-president; C. Parker, New York City, treasurer, and H. D. Gamble, Pittsburg, secretary.

WASHINGTON.

FERRY COUNTY.

(From Our Special Correspondent.)

Adirondack.—In a shaft 18 ft. deep, at Sheridan, a vein 18 to 20 in. wide, yields quartz with an average value of $8.90 per ton.

Lone Pine-Surprise.—No information is obtainable from the management of this Republic mine, but a comparatively large force is employed in the Lone Pine workings, and ore is being shipped to the Crofton Smelter.

North San Poil.—Fine looking ore is being mined. Drifting has been discontinued, and stopes have been started from the shaft. During the past two weeks 8 car-loads of ore have been shipped to the smelters.

Queen Victoria.—The contract for driving the tunnel is about completed.

Quilp.—The report of a strike on the No. 5 level of this mine at Republic seems to be without foundation.

Republic.—S. F. Parrish, manager of the B. C. Mine at Greenwood, B. C., and the Le Roi Mine, at Rossland, B. C., is in Republic sampling this mine from top to bottom.

Spotted Fawn and B. & N.—A cross-cut from a 50-ft. shaft has developed a vein 15 ft. wide, the material averaging $7.40 per ton.

San Poil.—The winze at this Republic mine is down 130 ft. Drifts have been started on the vein.

Violet.—The tunnel is in 210 ft.

Zala Consolidated.—In the winze below the 300-ft. level of this mine, at Sheridan, the vein, 3½ ft. wide, is all shipping ore, with a very rich streak. The vein is as wide on the No. 2 level, where a drift is following it. Some assorting is required to keep the ore clean. The mine is being put in repair for shipping ore as soon as the roads are in condition.

WHATCOM COUNTY.

(From an Occasional Correspondent.)

Great Excelsior Mining Company.—This company is the first to get to work on a commercial basis in the much-advertised Mount Baker District. It has a 20-stamp Fraser & Chalmers mill running day and night, and expects soon to be handling 100 tons of ore daily. The concentrates are reported to run $100 per ton. The company is contemplating sinking a winze below the main tunnel, and may add to the stamps in the mill.

FOREIGN MINING NEWS

AFRICA.

NATAL.

The Mines Department reports the total production of coal in the colony in January at 48,331 tons; a decrease of 3,987 tons as compared with January, 1902. There were 3,904 men employed, of whom 210 were whites, 2,121 negroes and 1,573 East Indians. The coal exported for the month was 1,679 tons; and 14,347 tons were sold to steamers at the port of Durban.

AUSTRALIA.

TASMANIA.

Mount Lyell Mining Company.—This company reports, for the four weeks ending March 4, a total of 21,577 tons smelted. The yield was 444 tons black copper, containing 440 tons fine copper, 43,387 oz. silver, and 1,463 oz. gold. The average yield was 2.04 per cent copper, 2.01 oz. silver, and 0.07 oz. gold per ton.

QUEENSLAND.

Mount Morgan Gold Mining Company.—This company reports for February a total of 18,242 tons of ore treated by chlorination. The yield was 10,248 oz. gold; an average of 0.56 oz. per ton.

CANADA.

BRITISH COLUMBIA—EAST KOOTENAY DISTRICT.

Crow's Nest Pass Coal Company.—The coal miners' strike at Fernie, Michel and Morrissey was stttled by the company making some concessions, and an agreement has been signed to last three years, with the privilege of either side revoking it at the end of two years on proper notice. The company recognizes the district executive of the Western Federation of Miners.

NOVA SCOTIA—CAPE BRETON.

Cape Breton Coal and Iron Company.—This company has been organized at Des Moines, Ia., by the merging of the Lake Ainslie Mining Company, organized some three years ago, with D. R. Ewing as manager, the Lewis Mountain Mining Company and the Margaree Mining Company. The stockholders are for the most part residents of Des Moines. The officers of the reorganized company are: N. E. Coffin, president; Oren Ruffcorn, vice-president; L. C. Bricker, treasurer, and E. H. Decker, secretary, who, together with Charles Crane, D. B. Brown, H. H. Reynolds, J. M. Goodson, F. H. Fitting, Dr. J. T. Fellows and H. J. Deards, constitute the board of directors. The properties of the company are located in Inverness County.

Dominion Coal Company.—The output of the company's mines for March was 289,669 tons, an increase of 28,200 tons over February.

MEXICO.

SONORA.

Creston-Colorado.—According to a press dispatch, John W. Gates, of Chicago, and his associates have concluded negotiations for the purchase of this property 15 miles east of Torres on the Sonora Railway. The original claims were held by Messrs. Price and Chamberlain, of Cleveland, O. John B. Farish, of Denver, Colo., examined the property for Mr. Gates.

MINING STOCKS.

(Full quotations are given on pages 581 and 582.)

New York April 8.

The mining share market has drifted, being without support of investors or speculators, and a low ebb of prices has been the result this week. Evidently professional operators are not yet ready to fulfil their promises of some time ago. It looks as if they were awaiting the expected increase in the Amalgamated quarterly dividend next month..

This week Amalgamated has sold a smaller number of shares than last week, and quotations have receded from $66¼ to $62¼. Anaconda on Wednesday softened to $26⅜, which compares with $29, touched a week ago. Sales of this stock are insignificant. On curb the coppers have been in moderate request at lower prices. Tennessee fell to $29¼ on fair trading, and Greene Consolidated to $23¾. Gold and silver shares were bought more freely at their low level prices. Ontario Silver, of Utah, brought $5.50; Standard Consolidated Gold, of California, $3.30; Portland Gold, of Cripple Creek, Colo., $1.40; and Best & Belcher, on the Comstock, $2.10.

The Exchanges voted to close on Good Friday.

Boston. April 7.

(From Our Special Correspondent.)

The same feeling of lassitude prevails in the local stock market that has been in evidence for some weeks. The only feature is the probable carrying through of the South Range copper mining deal, for a big holding company. The details are not yet arranged, and it can be said on the highest authority that this is the reason that the annual meeting of the Trimountain Mining Company has been postponed from time to time. The significance of this is seen in what President Fay, of the Trimountain, said last week, when he remarked that he had expected to be able to present information which he believed would meet with the unanimous approval of stockholders.

Copper Range Consolidated has fallen $3 to $61.75, notwithstanding the fact that the company sold 400,000 lbs. of copper last week at 15¼c. for May delivery. Centennial has lost $2 to $24. The annual report was issued to-day. Mohawk fell $3.50 to $50, but recovered easily. Osceloa touched $71.75, but slid off to $69, rallying to above $70.

Utah Consolidated maintains a steady tone, and yields only on heavy trading. The close to-night is off $1.87½ for the week to $27.87½. Bingham is fractionally lower at $30.75; United States Mining shows the slightest variation of almost any stock on the list, the range being but 50c. for the week. Dominion Coal and Dominion Iron continue to fluctuate widely, the former selling at from $102 to $111 per share, closing off $2.50 for the week at $108, and the latter from $29.25 to $24, both in the same day, closing off $1.62½ for the week at $26.62½.

Mass Mining sells with $1 assessment paid, but the assessment was almost lost in the market decline. Lawson's Trinity goes down with the rest, having touched $9.50.

Colorado Springs, Colo. April 3.

(From Our Special Correspondent.)

It has been an active week, with good trading and many fluctuations. Starting a week ago with the premature announcement of the settlement of the Cripple Creek strike, to be followed by the contradiction and later by the formal statement of the settlement. The effect of the settlement of the labor troubles had been discounted somewhat.

Acacia led the mines list by advancing from 7¾ to 9½c. Anaconda appeared in the list this week after a long absence, and sold from 16c. down to 15c., closing with 20c. asked and no bids. Elkton gained from 35½ to 37½c. El Paso showed an advance, selling from 57 to 61c., with 61c. bid and 62c. asked to-day. Gold Dollar Consolidated sold up from 4⅝ to 5¼c. yesterday, and back to 5⅛c. to-day.

Isabella shares opened last Saturday at 17⅝@18c., went to 19c. during the week, closing in bad form at 17¼c.

Salt Lake City. April 3.

(From Our Special Correspondent.)

The market, as a whole, remains unchanged. Those recording gains are Ajax, Boss Tweed, Daly West and Daly-Judge. The large amount of these high-priced shares dealt in this week advances the amount of business $20,000 over last week, while about 90,000 shares less have been exchanged. The heaviest traders in addition to the above were Lower Mammoth, May Day, Martha Washington, Victor and Wabash. The total amount of business for the week was 167,876 shares, for which $200,656 was paid.

San Francisco. April 4.

(From Our Special Correspondent.)

The market has been generally rather dull, with a slight improvement towards the close of the week. The course of prices has been generally downward.

Some quotations noted are: Caledonia, $2.30; Best & Belcher, $2.25; Consolidated California & Virginia, $1.60; Ophir, $1.55; Mexican, $1.10; Chollar, 94c.; Sierra Nevada, 78@80c.; Crown Point, 35c.

Business has been rather quiet in oil shares. While there was only moderate buying, prices were generally well maintained. Kern Oil sold at $4.80@$5; Home, $2.80; Monarch, 30c.; Lion, 8c. Monarch was a favorite in the trading.

COAL TRADE REVIEW.

New York, April 9.

ANTHRACITE.

A drop in temperatures late last week brought out a good run of retail orders, particularly at interior points, and helped reconcile consumers to the April price lists. Apart from the flurry in the retail trade due to the weather, business is brisk, and many orders placed for delivery during April will have to be filled during May. There have been a lot of petty strikes at the collieries, many of the miners having apparently got an idea that the Arbitration Commission decided that they should not work over 9 hours daily, whereas the Commission's award was that the miners should be paid on the basis of a 9-hour work day, overtime being expressly provided for. Some of the miners have also an idea that 8 hours should be a day's work on Saturday. The breaker boys, trapper boys, etc., like most boys, are in favor of short work days, and make trouble. However, there are no serious strikes, but considerable annoyance for operators and their superintendents. The troubles are expected to simmer down slowly. The board of conciliation, to consist of three persons representing the miners, three the operators and one appointed by a judge of the United States Circuit Court, will have its hands full for a while, explaining to the miners just what the awards of the Anthracite Commission were.

Owing to a strike of lake firemen and oilers no boats left lower lake ports last week, except, it is reported, one for Milwaukee. The strike is still on, and is delaying a heavy tonnage of anthracite that is wanted at upper lake ports. No vessels have passed through the Sault as yet, and in consequence there is little to say of the anthracite trade at Lake Superior points, for in that territory there is practically no anthracite for sale. At Chicago the announcement of the spring prices has brought out a lot of inquiries and orders from dealers, though some buyers apparently think they will be able to get coal in May at April prices. These prices are: Broken, $5.75; stove, egg and chestnut, $6, f.o.b. Chicago, Milwaukee and Superior. At the lower lake ports there is even more activity to get coal during April than at ports farther West. The April prices, f.o.b. cars, at Buffalo and Suspension Bridge, are: Broken, $4.75; egg, stove and chestnut, $5. Considerable coal is reported in storage at Buffalo to facilitate the make-up of vessel cargoes when the movement up the lakes has started. Along the Atlantic seaboard dealers seem anxious to get all the coal at April prices that they can. During the slack days at the end of March the Reading Company is reported to have stored considerable coal, but the other companies, except for what coal the Lehigh Valley has at Buffalo, stored very little. The April prices at Boston are: Broken, $6; egg, stove and chestnut, $6.25, with demand good.

BITUMINOUS.

The Atlantic seaboard bituminous trade continues quiet, though contracts for the current year are being closed right along. Producers of the lower grades of coal, now that producers of the better grades have taken about all the contracts they care for, are beginning to get their share of contracts. The prices named for deliveries of English and Scotch coals still affect the market for domestic coals, particularly at points beyond Cape Cod. The movement of coal from the mines is still hampered by short car supply, and this factor is not likely to show much improvement for some time in spite of recent large outlays for rolling stock by the main line roads.

As regards labor troubles, the voluntary increases in wages granted by nearly all producers, many of these increases being greater than those secured for miners in Pennsylvania, Ohio, Indiana and Illinois by the determined efforts of the United Mine Workers, are likely to handicap the effort that President Mitchell and other officials may make to organize the men in Maryland and West Virginia, and it is rather doubtful if there will be a serious strike this year, though men may be induced to quit work at some collieries in the Pocahontas and New River districts.

Trade at points beyond Cape Cod is quiet, though consumers are taking all the contract coal they can get. Along Long Island Sound there is more activity, but not much demand for speculative coal. At New York points trade is quiet, as consumers seem to be able to get all the coal they need without trouble. In the all-rail consumers are better off for supplies than in months.

Transportation from the mines to tidewater is still satisfactory, coal running through about on schedule time. Car supply at the mines continues short, ranging around 40 per cent of the total demand. In the coastwise vessel market, owing to high wind and fog, arrivals at the loading ports continue below the demands of shippers, and rates are firm. We quote: 85@90c. from Philadelphia to Sound points, and $1@$1.05 to Boston, Salem and Portland. From New York Harbor rates are 70c. to Sound points, and 85c. to Boston, Salem and Portland.

Birmingham. April 6.

(From Our Special Correspondent.)

The coal situation in Alabama shows no changes this week. A prominent operator, when asked as to new contracts, stated that at present no extra efforts are being made to get contracts, the coming convention of the miners, when new wage contracts will be made, being under consideration.

When the coke ovens now under construction are completed, it is believed that all the demands in the State for coke can be met. Considerable coke right now is being brought here from the Virginias.

T. H. Aldrich, Sr., and T. H. Aldrich, Jr., have secured a franchise from the city of Birmingham to operate an electric light and power concern. They propose to organize a company to be known as the Birmingham District Coal, Light and Power Company, and have secured coal lands about 6 miles from the city. The slack coal will be used in generating electricity, which will be brought to the city by wire. By-product coke ovens will also be constructed, and the gas therefrom used. The company will be incorporated at $500,000, with the privilege of increasing to $1,000,000 if necessary. The city of Birmingham exacted $7,500 for the franchise.

Chicago. April 6.

(From Our Special Correspondent.)

In general the wholesale coal trade is very satisfactory. Anthracite is now comparatively plentiful, and is selling at $6 on cars, with the retail price $7.25. It is estimated that 80 per cent of the normal rail supply of anthracite is coming in, and this, in connection with the mild weather and the preparations made by everybody who could do so, to burn bituminous, cause the market to be well supplied for spring needs. Anthracite by boat is not expected until April 20, at least, and will probably not arrive before May 1. Of course, there is no anthracite on the docks now.

Bituminous sales have recovered from the temporary depression due to a glut of the supply a month ago, and are fairly brisk. Both city and country trade are reported to be good. There is an especially good demand for smokeless, due to the discovery by many consumers of its value as a substitute for anthracite. Quotations to-day are, for car lots: Hocking, $4; Youghiogheny, $3.25; smokeless (Pocahontas, New River and Maryland), $4; Indiana and Illinois lump and egg, $2.75@$3; smithing, $3.75.

Much uncertainty exists as to the spring and summer prices of Western bituminous, but it is certain that they will be higher than last season's prices. Freight tariffs are 10 to 40c. a ton higher, and the cost of mining, in wages and materials, has materially increased. Dealers are now complaining that their profit should also be greater instead of remaining substantially unchanged, and it is not improbable that they, too, will find a way to make more out of the situation.

Cleveland. April 7.

(From Our Special Correspondent.)

The strike of the marine firemen on the lake has paralyzed business. The expected rush of coal to the head of the lakes has been checked, and now the boats are lying in port holding their cargoes and waiting for the opening of the Sault passage and for firemen. The Sault is still filled with ice, and the boats that have tried to break through have not succeeded. It is generally expected that the boats will be running through, however, before the week is out. The termination of the firemen's strike is still in future and uncertain. Discussion of season contracts has been held up by this uncertainty. The opening rates on going cargoes has been fixed at 40c. between Ohio ports and Duluth. Sharp advances on second cargoes, however, will be seen if the lake fleet is detained until the end of April.

The railroad situation in this territory is again becoming uncertain as the railroads are being congested. This week F. M. Kirk, a Cleveland coal dealer, sold to the Pittsburg & Eastern Coal Company a tract of land in Washington County, Pa., of 2,400 acres, which produces 3,000 to 4,000 tons of coal a day. It is a new field, and a part of the product will be shipped up the lakes.

Pittsburg. April 8.

(From Our Special Correspondent.)

Coal.—A strike of drivers who are dissatisfied with the new rate of wages, which went into effect on April 1, caused a suspension of operations at the river mines. The trouble was adjusted by the officers of the United Mine Workers ordering the strikers back to work, and all the mines are running to-day. In the settlement of the new scale the differential of 15c. a day in favor of the river miners over drivers at the

railroad pits was eliminated. The rate is now uniform at $2.56 a day. The demand for coal continues heavy, but operators are not booking any large contracts if it can possibly be avoided, as higher prices are expected to prevail. The two combinations have advanced prices to the retail dealers 15c. a ton, making the rate for 1¼-in. coal $2.15 a ton, delivered at Pittsburg.

Connellsville Coke.—The production and shipments continue to show gains each week, and unless a shortage of railroad cars prevents the output soon will be up to former high records. Prices are unchanged, except that premiums for prompt shipment are not as high as have prevailed during the past two months. The *Courier*, in its last report, gives the production for the previous week at 249,986 tons. The shipments aggregated 10,926 cars, distributed as follows: To Pittsburg and river tipples, 3,643 cars; to points west of Pittsburg, 5,989 cars; to points east of Connellsville, 2,026 cars. This was an increase of 27 cars.

San Francisco. April 4.

(*From Our Special Correspondent.*)

The coal market continues quiet and unchanged. Stocks are sufficient for all needs. Prices continue unchanged, notwithstanding the competition of fuel oil.

Yard prices to dealers for Pacific Coast coals in large lots are as follows: Wellington, $8.50; Southfield, $8; Rosslyn, $7; Seattle and Bryant, $6.50; Coos Bay, $5.50; white ash, $5. Rocky Mountain coals in car-load lots are quoted at $14 for Colorado anthracite, and $8.50 for Castle Gate, Clear Creek, Rock Spring and Sunnyside. Eastern coal in cargo lots is at present nominal, but quotations continue at $14 for Pennsylvania anthracite and $12 for Cumberland. Foreign coal in cargo lots sells as follows: Welsh anthracite, $13; cannel, $8.50; Brymbo, $7.50; Wallsend, $6.50.

Foreign Coal Trade. April 9.

There is nothing new to report here, as to exports or imports. Trade continues very quiet.

The coal production of France for the past year is officially reported as follows, in metric tons:

	1901.	1902.	Changes.
Nord and Pas-de-Calais..	19,690,206	18,363,791	D. 1,326,415
Other departments	11,943,382	11,210,339	D. 733,043
Total	31,633,588	29,574,130	D. 2,059,458

The decrease in 1902 was due chiefly to the strikes and labor troubles which restricted production during the latter part of the year.

Messrs. Hull, Blyth & Co., of Cardiff and London, report under date of March 28 that there is no noticeable change in the tone of the Welsh coal market. Prices remain firm, but stormy weather round the coast is retarding tonnage, and this to some extent prevents a further advance in prices. Quotations are: Best Welsh steam coal, $3.42@$3.48; seconds, $3.36; thirds, $3.24; dry coals, $3.24; best Monmouthshire, $3.12@$3.18; seconds, $3.06; best small steam coal, $2.22; seconds, $2.04; other sorts, $1.80.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market remains firm for all directions, and tonnage is scarce. Some rates quoted from Cardiff are:

Marseilles, $1.65; Genoa, $1.68; Naples, $1.68; Las Palmas, $1.62; St. Vincent, $1.74; Rio Janeiro, $2.52; Santos, $2.88; Buenos Aires, $2.04.

IRON TRADE REVIEW.

New York, April 8.

Business continues heavy in almost all lines, though buyers are still fighting for concessions on long contracts. The incident of the week has been the reduction of prices on Southern iron by $1 per ton on No. 2 foundry as a basis. This has given rise to a belief that further concessions may be secured, and has caused some hesitation in purchases.

Railroad transportation conditions are better, and the furnaces are generally well supplied, and able to run without interruption. Production is therefore better.

On the other hand, there will probably be some delay in getting supplies of ore down the lakes. Vessels are ready to start, and navigation is open this week, but everything is tied up by a strike of the firemen, which may take some time to settle.

The statement of the United States Steel Corporation for the quarter ending March 31 shows that the net earnings for the quarter were $24,656,136. Deductions were: Sinking fund and depreciation fund, $3,104,947; interest and sinking fund on bonds, $4,560,000; total, $7,664,947, leaving a balance of $16,991,189. From this there were paid dividends of 1¾ per cent on preferred stock—$8,929,919—and 1 per cent on common stock—$5,083,025; a total of $14,012,944, leaving a balance of $2,978,245, undivided earnings for the quarter. As compared with the first quarter of 1902, the total net earnings showed a decrease of $1,623,463 this year. This decrease was largely due to the railroad congestion, which interfered with the operations of furnaces and mills, and prevented prompt deliveries. The unfilled orders on the books on April 1, for all manufactured products, amounted to 5,410,719 tons.

Birmingham. April 6.

(*From Our Special Correspondent.*)

The reduction of $1 per ton in pig iron prices announced during the past week by the Southern Association furnaces came suddenly and very surprisingly. It was given out just a few days before that the market was strong and that some good orders had been booked. The price of No. 2 foundry was steadily maintained at $18.50 per ton. It was said that there was an invasion of foreign irons in the territory supplied by the Southern furnaces, causing the reduction. Consumers claim that their waiting game is responsible for the reduction, and some of them are inclined to believe that by waiting longer further reductions can be brought about. On this score one of the leading iron men of the district asserts positively that there will be no further reduction in prices, and that the buying will commence at once, sales of 5,500 tons being noted by one concern already. Intimation is also made that the Association reduced prices in order to forestall a general cut by outside makers. The reduction in price, it is believed, will cause a general resumption of buying, and though but four days have passed since the reduction was announced, there have been a few sales made and some inquiry for the product.

The production of pig iron in this district is heavy. The Tennessee Coal, Iron and Railroad Company has blown in No. 1 furnace at Bessemer, making five in all at that point now making iron. The company is pushing the work of repairing the second Oxmoor furnace, and expects to have it in blast within 60 days. The Sloss-Sheffield Steel and Iron Company's furnace at Florence is still being repaired.

The Southern Association furnaces will continue the practice of giving Eastern consumers $1 per ton advantage over the Western buyers; that is, iron quoted at $17.50 per ton for No. 2 foundry now is quoted East at $16.50. This has been in effect ever since the Association has been intact.

The following quotations are now given: No. 1 foundry, $18.50@$19; No. 2 foundry, $17.50; No. 3 foundry, $16@$17; No. 4 foundry, $15.50@$16; gray forge, $15@$16; No. 1 soft, $19; No. 2 soft, $17.50.

In finished iron and steel circles good conditions are reported in this State. The rolling mills at Bessemer turned out more finished iron and steel during the month of March than ever before in one month. The Birmingham and the Gate City rolling mills are doing well. At Ensley the Tennessee Company has started its steel rail mill, and expects to operate it steadily.

Foundries, machine shops and cast iron factories are operating steadily and using a good quantity of iron. G. Schumacher, of New York, vice-president of the Central Foundry Company, owning and operating cast iron pipe factories at Bessemer and Anniston, Ala., has been in Birmingham looking over the situation. It is understood that the company is laying in stock for the future.

The Sloss-Sheffield Steel and Iron Company has come into full possession of the property of the old Lady Ensley Coal, Iron and Railroad Company, sold during the past week in the chancery court. The property embraces 16,000 acres of ore lands and 17,000 acres of coal lands, on which are ore and coal mines and 200 coke ovens in full operation, and is valued at over $2,000,000. The Sloss-Sheffield Company assumed all liabilities and did not issue any new stock to cover the purchase.

Chicago. April 6.

(*From Our Special Correspondent.*)

The feature of the past week, in the pig iron market, has been the reduction in the price of Southern iron by the Southern combination, of $1 for the West and middle West, and $2 for the seaboard. Locally, the result of this cut, ostensibly made for the purpose of stimulating trade and keeping foreign iron out of the market, has been to make buyers believe a general reduction of prices of iron to be impending, and so a result opposite to that intended has ensued—trade is dull. It is, of course, only a question of a little time before the necessities of the foundrymen will compel them to realize the true state of things, and then briskness will come about. During the great difficulty caused by the lack of adequate transportation last winter, considerable foreign iron found its way to the Chicago market, but at present the coast trade seems to be absorbing it all, so this feature of the situation has little local bearing. Chicago furnace representatives find two peculiar features in the cut—the fact that it was publicly announced, and the fact that it is not enough to stimulate the desired buying. Had the reduction been two or three times as great, there would no doubt be a sudden boom in sales; but as it is, there is not a little feeling against the combination and the belief is expressed that the reduction was made for the benefit of the combination rather than of the trade.

Quotations to-day are: No. 2 Southern, $21.85, Chicago, or $17.50, Birmingham; No. 2 Northern, $22@$22.50, for the second and third quarters of the year. There is, of course, more Southern than Northern available; the Northern furnaces are quite sold out up to July 1, and occasional small lots for delivery before that time bring a premium of $1 to $1.50. The local furnaces are well sold out; they have probably not 100,000 tons to sell, and are likely to continue very much behind their orders for several months.

Coke is somewhat weak, and sells at $9@$9.50. Much complaint is made of the short time—five days—now allowed for unloading coke. Before the present regulations, which are an outgrowth of the transportation trouble of last winter, 15 days were allowed for holding coke cars. In general the transportation situation has but slightly improved with the coming of warmer weather.

Cleveland. April 7.

(*From Our Special Correspondent.*)

Iron Ore.—A strike of the marine firemen has tied up all of the boats, and as it is complete and the men are obstinate the boats will probably not move through the remainder of the month. The vessel owners are trying to obtain non-union men, but have not succeeded. The removal from the shipping season of the entire month of April will increase the possibilities of high freights on the lakes for the remainder of the year. Vessel owners, therefore, are holding off, hoping to get every advantage of any rates that may be offered. Naturally nothing whatever is being done toward making season contracts for the transportation of ore. The prices upon which ore is sold have not changed, being based on $4.50 for bessemer old range and $4 for bessemer Mesabi.

Pig Iron.—Foundry grades have been sold freely. The orders have been small but numerous, and lately the aggregate tonnage has been very heavy. Most of the material for spot delivery comes from the Southern Ohio furnaces or from those outside of this territory. The buying for second half has not continued as heavy as at first expected, and the business seems a little backward. The prices hold as they have been. No. 2 is quoted at $22, Southern Ohio furnace; and for second half $21@$21.50, Valley furnace. Basic iron is about off the market for spot shipment, and very little is being done in the way of second half deliveries. Prices remain $21.50@$22, Valley furnace, for first half delivery, and $20, Valley furnace, for second half.

Finished Material.—The market has been steady, without feature and without more than the ordinary run of business. The structural situation is a little stronger than it was, and the market is looking up. The prices remain as they have been, 1.60c., Pittsburg, from the larger mills, and 1.75@1.85c. from the smaller mills. The demand for rails has been heavier. One order of 4,000 tons was covered a few days ago, and others are pending. The electric lines are taking these in the main. Some smaller orders are also in. Light rails have been in good demand, and the transactions have been satisfactory. The prices have not changed, $28 being charged for standard rails and $36, Pittsburg, for light rails. Plates are strong, but inactive. Prices remain at 1.60c., Pittsburg, from the larger mills, and 2c. at the mills for the smaller concerns. Sheets are getting much stronger than they have been. Prices hold firm; for No. 27 out of stock, black sheets, 3.10c.@3.25c.; with the same gauge bringing 1.85c.@1.95c. at the mill. Bars are stronger than they have been, and the buying has started in earnest. The prices will be fixed at a meeting at Pittsburg this week, and advances are expected. Temporarily bar steel is bringing 1.60c., Pittsburg, for bessemer, and 1.70c., Pittsburg, for open-hearth. Bar iron holds at 1.85c., Youngstown.

Old Material.—Steel scrap is in big demand, and the market is strong. Other scrap is selling listlessly.

Philadelphia. April 9.

(*From Our Special Correspondent.*)

Pig Iron.—The week's business in pig iron has been of insignificant proportions. Quotations continue substantially where they were, and the larger class of buyers who are pretty well supplied have terminated some negotiations which have been hanging fire for two or three weeks.

Steel Billets.—Reports on this branch of the trade are somewhat conflicting. The pitch of the matter seems to be that a great deal of business is under consideration, and that buyers have named prices for late delivery, which manufacturers are disinclined to accept.

Merchant Bar.—Merchant is very strong, and in a retail way is active, but in large lots is dull. The car-builders have apparently withdrawn from the market, having succeeded in making favorable terms for summer and later deliveries.

Nails.—The past week has developed considerable activity in both wire and steel nails, which is the usual incident of spring building activity.

Sheets.—The reports to-day from our sheet makers do not indicate any material change over conditions mentioned last week.

Pipes and Tubes.—In tubes the consumption is even greater than two or three weeks ago. Merchant pipe is also very strong, although consumers are complaining here and there of some delay in deliveries.

Plates.—There is quite a lot of business hanging fire for tank and boiler plate. The smaller consumers are now making themselves heard. Good reports come from all over our territory.

Structural Material.—The interference with construction is not interrupting the activity at the mills. Some shipments have been suspended, but work is being crowded to the very utmost. There is a disposition among large builders to insist upon concessions.

Steel Rails.—There is an active inquiry for girder rails. As to standard sections it is again given out that $28 will be adhered to.

Old Rails.—Old rails are asked for oftener than they can be supplied.

Scrap.—Two or three parties who have been holding back from paying prices demanded for heavy scrap, this week yielded a point and ordered. Railroad scrap is very urgently sought. Low phosphorus scrap is out of the market. More country scrap is beginning to come in. Machinery cast is selling freely. The entire scrap market is beginning to look up.

Pittsburg. April 7.

(From Our Special Correspondent.)

The pig iron market is remarkably active this week, and while buying in finished lines is not as heavy as during the past few weeks the market continues strong. Consumers of plates and structural material are pretty well covered, and the mills have enough business on the books to keep them in steady operation for several months. The strike of structural iron workers may possibly have had the effect of delaying some orders that were about to be placed, but the mills do not feel the loss. A meeting of the Plate Association was held in New York last Thursday, but no change was made in prices. Conditions were discussed, and the outlook was considered very satisfactory. Premiums over the base price of 1.60c. are charged for small lots, and for deliveries within the next two or three months, but they are not as large as prevailed a year ago.

There has been a great improvement in the freight movement, and shipments during the past week have been satisfactory. All the blast furnaces in the Pittsburg District and in the Valleys are in full operation, and coke deliveries are better than for several months. The threatened trouble with the blast furnace workmen, which was looked for on May 1, has been averted by a vote of the men. As told in the report several weeks ago the executive committee of the International Association of Blast Furnace Workers and Smelters at a meeting held in Youngstown, decided to submit the question of demanding 8-hour turns to a vote of the membership. These votes were counted at a meeting held in Buffalo last week, and the result was against making the demand, but instead an advance in wages will be asked. A satisfactory arrangement likely will be made. Agents of Southern furnaces have been in this district during the past few days, and have been quoting new prices on pig iron. A cut has been made on the rates that have ruled since the first of the year. Sales of forge and basic iron aggregating 10,000 tons are recorded. Forge was sold at $19.85, delivered at Pittsburg, and basic at $21.85. No. 2 foundry iron was quoted for delivery here at $21.35, but deliveries cannot be made until after July 1. A sale of 3,000 tons of Southern forge iron was made yesterday at $19.85, for immediate delivery, while Northern forge is held firmly at $20.50, Pittsburg.

The demand for steel continues heavy, but there is little available in the open market, and prices are firm. No foreign steel is coming into this district. It had been rumored that steel bars were to be advanced, but there seems to be no foundation for the report. Agricultural implement manufacturers are expected to place their contracts this month, but they will not be affected by any price advance that may be decided upon. The advance in sheets that was looked for on April 1 did not come, although the market is unusually strong. This is indicated by the starting of the remodeled plant of the Canonsburg Iron and Steel Works, the new corporation that purchased the works formerly operated by the Canonsburg Iron and Steel Company. As noted last week a strike was ordered by the Amalgamated Association of Iron, Steel and Tin Workers, but it only continued for two days, when the company made a settlement by signing the scale. It is understood the association entered into an arrangement that gives the company some advantage. The mills were started, and the other four will be put in operation as soon as the steel required can be obtained. There are but few independent sheet mills running that have not their own steel supply.

All talk of the probable absorption by the United States Steel Corporation of the interests of the Jones & Laughlin Steel Company, the Clairton Steel Company, and the Shenango Furnace Company, has subsided. The expected official announcement that the deals had been concluded has not been made. It is known that there is a decided hitch in the Clairton deal, but the fact that the Jones & Laughlin Company has taken no steps toward the great improvements and extensions announced two months ago, is believed here to mean that the deal with the Corporation has either been quietly concluded or that it soon will be. The company is still taking on new business, and has orders booked that insure the steady operation of its plants for the rest of the year. The rumor that W. P. Snyder will succeed C. M. Schwab as president of the big Steel Corporation is firmly believed here to be correct. If the change is made there is no doubt that the pending scale will be speedily concluded.

Active preparations are being made for the annual convention of the Amalgamated Association, which will open in Columbus on Tuesday, April 14. On account of the prosperous outlook for the iron and steel industry a favorable adjustment is expected when the new wage scales are presented. The present agreements expire on June 30, and this will give over two months time to come to an agreement. From the suggestions made by the different lodges and compiled for use in the convention, it is noted that no demands will be made for an advance in any of the branches. The manufacturers, however, are expected to make some demands, among them being a removal of the limit of output on sheets and tin-plate. From the sentiment of the members this will be conceded, as it is due to the unlimited production in its non-union mills that the United States Steel Corporation has an advantage over independent concerns that are operated under union rules. Some other changes are likely to be asked, but no serious difficulty is anticipated.

The strike of the structural iron workers does not seem to be near a settlement. The American Bridge Company is still bringing men into the district to take the places of the strikers, but is not making much progress on its contracts.

Pig Iron.—Sales of bessemer and basic pig iron made since Friday aggregate 25,000 tons, and were made chiefly to small consumers in lots of from 3,000 to 5,000 tons. The price of bessemer for second-half delivery was $20, Valley furnaces, and $21 for delivery in the second quarter. Some sales for shipments extending through the second and third quarters were at $20.50. For early delivery foundry No. 2 is quoted at $21.50@$22, Pittsburg, and gray forge for any delivery is held at $20.50, Pittsburg.

Steel.—The demand is active in all lines of steel, but there is a scarcity of billets. Bessemer is still quoted at $31.50, and open-hearth at $32@$33. Orders for plates continue to exceed shipments, but prices are unchanged, tank-plate being quoted at 1.60c. Steel bars are also held at that price, but it is still rumored that an advance may soon be made.

Sheets.—The sheet market continues to gain in strength, and all mills that can obtain steel are operating full. The leading independent interest that has been running steadily for a year was forced to close two mills last week on account of not being able to get a supply of steel. No. 28 black sheets are still quoted at 2.75c., and galvanized at 3.85c.

Ferro-manganese.—There is but little new business, and the foreign product is still quoted at $50@$52.50.

New York. April 9.

Pig Iron.—The market is more active, and some fair-sized sales are reported. The cut in Southern iron is affecting the demand for foreign iron. We quote for early delivery, Northern irons at tidewater: No. 1X foundry, $22.50; No. 2X, $21; No. 2 plain, $20.50. For Southern iron on dock, New York: No. 1 foundry, $21.75; No. 2, $20.75; No. 3, $20.25.

Bar Iron and Steel.—We continue to quote for large lots on dock: Refined bars, 1.95@2c.; soft steel bars, 1.80@$1.90c.

Plates.—Eastern mills have in some cases met quotations made by Pittsburg mills. Inquiries for some large amounts have been received, and some good-sized contracts closed. The shipyards need material, but are delaying buying until after May 1, fearing unreasonable demands from labor unions. Tank, ¼-in. and heavier, is quoted at 1.85@1.95c.; flange, 1.95@2c.

Steel Rails.—The quotation remains $28 for standard sections, f.o.b. mills for 1903 delivery; light rails, $32@$36, according to weight. Relaying rails are $28@$30 for heavy sections and $33@$35 for light sections.

Structural Material.—The strike of the structural iron workers, so far as this territory is concerned, will probably be settled soon. Demand for structural material is good. We quote for large lots at tidewater: Beams, angles, channels and tees, 1.75@2c.

Cartagena, Spain. March 21.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Since last report three cargoes, 7,400 tons, manganiferous ore have been shipped, all to British ports. As a whole trade is decidedly better, orders being more numerous and various indications point to the possibility of a heavy buying movement in the near future. Were it not for the irregularity and uncertainty with regard to fuel supply we believe business of considerable size would be made for shipment to America, and as it is several contracts are reported as having been made in that direction.

Prices are firm at 6s. 9d.@7s. per ton, f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43 per cent sulphur and 40 per cent iron, are quoted at 10s. 6d. per ton. No shipments are reported for the week.

CHEMICALS AND MINERALS.

(See also Prices-Current on page 584.)

New York, April 9.

There is no relaxation in demand, as most manufacturing industries are consuming good quantities of chemicals. Prices with few exceptions are steady, and it is the consensus of opinion that they will advance as soon as deliveries have been completed on current contracts, which had been taken at about bottom figures.

Raw materials, especially brimstone and nitrate of soda, are momentarily easy, owing to heavy arrivals. However, the rising ocean freight rates from primary markets will no doubt initiate a recovery in prices here. In another column we comment on the renewal of the agreement among the nitrate of soda producers in Chile.

Cyanide of Potassium.—Imports are moderate just now, although the consumption shows signs of recovery. Quotations continue at 20@20½c. per lb., f.o.b. New York, for wholesale lots.

Bleaching Powder and Chlorine.—Conditions are little altered from last week, and the market closes quiet. Prices for bleaching powder per 100 lbs. are as follows: Domestic, $1@$1.12½, f.o.b. works; foreign, $1.20@$1.25, f.o.b. New York, for future shipments, and $1.37½@$1.62½ for early deliveries. Liquid chlorine, imported from Germany, is held at 30c. per lb., f.o.b. New York, and chlorine water, 10c.

Copper Sulphate.—Sellers are firm in their views, asking $5.50 per 100 lbs., f.o.b. New York. Second hands might shade this figure. Consumption in this country is good, but export trade is on the wan.

Acids.—Nearly all the commercial acids are in demand, and prices continue steady.

Quotations per 100 lbs. are as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic com'l...	$5.25@$5.50
Muriatic, 20°..	1.60	Sulphuric, 50°,	
Muriatic, 22°.	1.75	bulk, ton....	13.50@14.50
Nitric, 36°....	4.37½	Sulphuric, 60°.	1.05
Nitric, 38°....	4.75	Sulphuric, 60°,	
Nitric, 40°....	5.00	bulk, ton	18.00@20.00
Nitric, 42°....	5.37½	Sulphuric, 66°,	1.20
		bulk, ton	21.00@23.00

Brimstone.—The spot market has been demoralized of late, sales being made as low as $21.75 per ton, but at the close this week $22 is asked. Fortunately for importers comparatively little brimstone is sold on spot, as large customers make time contracts. Shipments of best unmixed seconds are worth $22@$22.25, and best thirds, $21@$21.25.

Exports of brimstone from Sicily in February and the two months of this and last year, were as follows, in long tons:

	February, 1903.	Two months. 1902.	1903.
United States	18,606	36,200	32,016
Other countries	34,285	45,717	54,383
Total	52,891	81,917	86,399

The increase this year is equal to 4,482 tons, due principally to the heavier demand in France. The shipments to the United States consisted of 24,945 tons best unmixed seconds, and 7,071 tons best thirds, making a total of 32,016 tons, which, compared with last year, shows a decrease of 4,184 tons.

The production of brimstone in Sicily in the two months ending February 28, was approximately as below, in long tons:

	1902.	1903	Changes.
Stocks, Jan. 1	460,123	489,113	I. 28,990
Exports	81,917	86,399	I. 4,482
	542,040	575,512	.....
Stocks, Mar. 1	451,650	457,020	I. 5,370
Production	90,390	118,492	I. 28,102

The increase this year amounts to nearly 30 per cent. In reporting stocks we have added 150,000 tons, usually carried at mines, to the quantity held at sea ports.

Pyrites.—Importers are paying higher freight rates from Spain, the latest charter being at 12s. ($2.88). Abroad, however, pyrites are quoted lower. Domestic pyrites are in good request. Prices are unchanged.

We quote for domestic pyrites, $5 per ton, for lump ore, f.o.b. mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 12@13c. per unit for lump, and 10@11c. for fines, delivered at New York and other Atlantic ports.

Nitrate of Soda.—Spot and early arrivals are obtainable at $2.05@$2.10 per 100 lbs., while futures are worth $1.87½@$2, according to position. Ocean freight rates from Chile are firmer, a charter having been taken to the United States at 15s. ($3.69), which is an advance of nearly 2s. (48c.) over the previous booking.

Messrs. Mortimer & Wisner, in their monthly statement of nitrate of soda, dated New York, April 1, give the following interesting statistics, in long tons:

	1903.	1902.	1901.
Imported into Atlantic Ports from W. C'st S. A. from Jan. 1, 1903, to date	49,485	25,973	47,733
From Europe	.....	.....	.....
	49,485	25,973	47,733
Stock in store and afloat April 1, 1903, in N. Y.	1,000	.....	3,797
Boston	.....	.....	133
Philadelphia	.....	239	.....
Baltimore	2,500	533	.....
To arrive, due July 15, 1903	73,000	44,240	36,533
Visible supply to July 15, 1903	76,500	45,013	40,467
Stock on hand Jan. 1, 1903	7,800	10,000	1,793
Deliveries past month	16,952	11,947	15,779
Deliveries since Jan. 1 to date	53,785	35,533	45,593
Total yearly deliveries	.....	179,613	175,176
Prices current, April 1, 1903	2.10c.	2.30c.	1.80

Sulphate of Ammonia.—The improved consumption by fertilizer makers has stiffened prices for good gas liquor sulphate of ammonia. Early shipments are quoted at $3.20 per 100 lbs., while futures are held at $3.30.

Phosphates.—Trade is improving, and better prices are being realized. In mining regions the weather is such as to permit active production, and preparations are being made to meet the large demand that was experienced a year ago.

According to report the Charleston (S. C.) Mining and Manufacturing Company, an adjunct of the Southern fertilizer combination, has contracted for 70,000 tons of phosphate rock, which will be mined at the property of the S. M. Ward Mining Company, at Swan Creek, Tenn. Shipments, however, cannot be made until the branch railroad has been built from the mouth of Swan Creek to the J. J. McGill farm, perhaps this year. It may be mentioned incidentally that the Virginia-Carolina Chemical Company has purchased, according to a current report, extensive phosphate deposits in Cuba.

Tennessee rock is strengthening in price, as the consumption is increasing. The production for last year is officially reported at 454,078 long tons, which is the largest quantity in three years. This total compares with the estimate of 429,902 tons given in our Journal on January 3, 1903, which shows a difference of only about 5 per cent.

Florida shipments are increasing. The exports of high-grade rock through Savannah in March amounted to 23,042 long tons, which is the largest quantity reported in five months. Since January the exports have aggregated 38,843 tons, which, compared with the corresponding three months last year, shows an increase of 11,804 tons, or over 43 per cent. Most of this has been taken by Germany. A charter from Tampa to Japan is reported at 20s. ($4.80), which compares with 23s. ($5.52), booked previously. Another has been taken from Port Inglis to Malmo, Sweden, at 14s. 4½d. ($3.45).

South Carolina miners have been doing a better domestic business than export, as abroad competition is very keen with the African phosphates.

Acid phosphates are selling at 55@65c. per unit. Phosphates are quoted as follows:

Phosphates	Per ton F. o. b.	United Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (78@80%)	$6.50@$7.00	6⅝@7¼d.	$10.47@11.46
*Fla. land peb. (68@73%)	3.25@ 3.50	5½@5¾d.	7.70@ 8.05
†Tenn., (78@82%) export	3.75@ 4.00	6⅝@7d.	10.20@11.20
†Tenn., 78% domestic	3.25@ 3.50	.....	.....
†Tenn., 75% domestic	3.00@ 3.25	.....	.....
†Tenn., 73@74% domestic	2.50@ 275	.....	.....
†Tenn., 70@72% domestic	2.25@ 2.50	.....	.....
‡So. Car. land rock	....@ 3.25	.....	.....
‡S. Car. riv. r'k (55@60%)	2.75@ 3.00	5½@5⅝d.	5.95@ 6.24
Algerian (63@68%)	.....	5¼@5¾d.	6.83@ 7.48
Algerian (58@63%)	.....	5½@5¾d.	6.15@ 6.90
Gafsa (Tunis)	.....	5½@5¾d.	6.15@ 6.90
Christmas Is. (82@86%)	.....	7¼@7¾d.	12.18@13.02

* Fernandina, Tampa, Brunswick or Savannah.
† Mt. Pleasant. ‡ On vessels, Ashley River.

Liverpool. March 25.

(Special Report of Joseph P. Brunner & Co.)

Trade generally in heavy chemicals is quiet at present, while fertilizers are in a strong position.

Soda Ash is moving off at the usual range as to destination. For tierces the nearest values are about as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s, 6d.@£6 7s. 6d. per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton, net cash. Bags, 5s. per ton under price for tierces.

Soda Crystals are in fair request at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for a few favored markets.

Caustic Soda is not quite so brisk, but quotations are well maintained as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Special terms for the Continent and a few other export quarters.

Bleaching Powder shows no improvement, and there is very little doing outside of deliveries on running contracts. For hardwood packages, £4@£4 5s. per ton is about nominal range, but quotations vary according to market.

Chlorate of Potash is in light demand, and quoted at 2⅞@3d. per lb., net cash.

Bicarb. Soda is steady at £6 15s. per ton, less 2½ per cent for the finest quality in 1-cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of Ammonia is in request and again dearer at £13 12s. 6d.@£13 15s. per ton, less 2½ per cent for good gray 24@25 per cent in double bags, f.o.b. here.

Nitrate of Soda is in demand on spot at £9 10s.@£9 12s. 6d. per ton, less 2½ per cent for double bags f.o.b. here, as to quality.

METAL MARKET.

New York, April 9.

Gold and Silver Exports and Imports.

At all United States Ports in February and Year.

Metal	February. 1902.	February. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports	$8,865,480	$1,508,370	$10,639,155	$1,583,513
Imports	1,696,967	1,771,758	3,102,754	3,559,605
Excess.	E. $6,968,513	I. $263,388	E. $7,536,401	I. $1,976,092
Silver:				
Exports	$3,926,585	$3,806,514	$8,450,595	$7,443,930
Imports	2,005,643	1,687,009	4,113,324	3,580,972
Excess.	E $1,920,942	E. $2,179,505	E. $4,337,271	E. $3,862,95

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending April 8, and for years from January 1:

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week	$24.800	$5.018	$33.070	.....	E. $52.852
1903	1.315.951	2,505.897	5.347,870	336.197	E. 3,821,727
1902	16 419.384	963,061	9,976.324	375,296	E. 25,057 351
1901	10,818,289	842,984	10,512,335	1,190,255	E. 19 227.462

The movement this week was principally with London and the West Indies. There were no silver imports.

Financial Notes of the Week.

The scarcity of money and the superabundance of securities continue to show their effects in the depressed stock markets. There has never been a time, however, when Wall Street has had so little effect on general business conditions. Reports from all quarters show that trade continues active, and that there is confidence in the situation.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending April 4, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts	$904,440,600	$907,223,400	$903,984,900
Deposits	985,781,300	964,618,300	888,762,300
Circulation	31,781,300	31,059,900	42,970,700
Specie	182,860,500	173,254,200	158,146,200
Legal tenders	69,402,800	70,549,900	66,175,200
Total reserve	$252,263,300	$243,804,100	$224,321,400
Legal requirements	246,445,325	241,154,575	222,190,575
Balance surplus	$5,817,975	$2,649,525	$2,130,825

Changes for the week, this year, were an increase of $69,900 in circulation, and decreases of $614,300 in loans and discounts, $5,497,700 in deposits, $5,315,300 in specie, $209,200 in legal tenders, and $4,150,000 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd.	$173,254,200	.....	$158,146,200	.....
England	176,402,590	.....	180,990,130	.....
France	510,782,255	$221,039,540	502,662,760	$219,819,700
Germany	174,455,000	64,530,000	151,420,000	53,205,000
Spain	70,365,000	90,815,000	72,295,000	101,150,000
Neth'l'ds	23,913,500	32,756,500	19,687,000	33,263,000
Belgium	15,716,665	7,858,335	15,563,335	7,781,665
Italy	80,405,000	10,638,500	87,795,000	11,366,500
Russia	365,965,000	41,065,000	397,065,000	42,375,000

The returns of the Associated Banks of New York are of date April 4, and the others April 3, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Owing to the Philippine requirements and the Government purchases for this account, the silver market is steady to firm. It obtains, however, that the London market does not at present call for large amounts. Should a demand for the East or Continent spring up it ought to put silver up.

The United States Assay Office in New York reports receipts of 38,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to March 26 are reported by Messrs. Pixley & Abell's circular, as follows:

	1902.	1903.	Changes.
India	£1,837,585	£1,968,200	I. £130,615
China	16,500	106,500	I. 90,000
The Straits	250	128,491	I. 128,241
Total	£1,854,335	£2,203,191	I. £348,856

Receipts for the week, this year, were £154,000 in bar silver from New York, £4,000 from the West Indies, £4,000 from Chile, and £9,000 from Australia; total, £171,000. Shipments were £200,500 in bar silver to Bombay.

Indian exchange is lower, the demand for bills having fallen off, as it usually does at this season. The Council bills offered in London were taken at an average price of 15.96d. per rupee. Buying of silver for Indian account continues on a moderate scale.

The Treasury Department's estimate of the money in the United States on April 1 is as follows:

	Total.	In Treas.	In circ'lat'n.
Gold coin (inc. bullion in Treas.)	$1,261,743,201	$276,815,804	$622,002,398
Gold certificates	.....	.....	362,924,999
Silver dollars	551,615,317	15,550,924	74,476,840
Silver certificates	.....	.....	461,587,753
Subsid. silver	100,786,118	8,500,673	92,285,445
Treasury notes of 1890	21,501,000	80,828	21,420,172
U. S. notes	346,681,016	2,406,334	344,274,682
Currency certif.	.....	.....	.....
Nat. bank notes	382,519,258	9,733,404	372,785,854
Total	$2,664,845,910	$313,087,967	$2,351,757,943

Population of the United States April 1, 1903, estimated at 80,142,000; circulation per capita, $29.34. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the Government. This statement of money held in the Treasury as assets of the Government does not include deposits of public money in National Bank Depositaries, to the credit of the Treasurer of the United States, and amounting to $142,607,765. The total amount in circulation April 1 shows a decrease of $2,238,387 from that reported on March 1; but an increase of $99,710,586, as compared with April 1, 1902.

The coinage executed at the mints of the United States in March and the 3 months of this year is reported by the Treasury Department as below:

Denominations.	March Pieces.	March Value.	Jan.-Mar., 1903. Value.
Double eagles	293,444	$5,868,880.00	$11,206,680.00
Eagles	49	490.00	1,951,200.00
Half eagles	202,062	1,010,310.00	8,670,310.00
Quar. eagles	96	240.00	240.00
Dollars for La. Exp.	.....	.....	175,178.00
Total gold	495,651	$6,879,920.00	$22,003,608.00
Dollars	1,026,325	1,026,325.00	3,876,325.00
Half dollars	665,097	332,548.50	560,548.50
Quar. dollars	420,325	105,081.25	172,081.25
Dimes	1,320,325	132,032.50	215,032.50
Total silver	3,432,072	$1,595,987.25	$4,823,987.25
Five c. nickels	3,924,000	196,200.00	467,000.00
One c. bronze	10,552,000	105,520.00	243,000.00
Total minor	14,476,000	$301,720.00	$710,000.00
Total coinage	18,403,723	$8,777,627.25	$27,537,595.25
Total coinage, 1902..	17,339,443	3,187,734.70	23,203,621.70

The increase of $4,333,974 this year was due principally to the heavier coinage of gold.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$.38½	$ 40½
Peruvian soles and Chilean pesos	.36	.39
Victoria sovereigns	4.85	4.88
Twenty francs	3.86	3.88
Twenty marks	4.74	4.80
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

April.	Sterling Exchange	Silver N. Y. Cts.	Copper London, Pence.	Copper Lake, Cts. per lb.	Copper Electrolytic, Cts. per lb.	Copper London, £ per ton	Tin, Cts. per lb.	Lead Cts. per lb.	Spelter N. Y. Cts. per lb.	Spelter St. L., Cts. per lb.
2	4.86⅜	49⅜	22⅛	14⅝ @14⅞	14½ @14⅝	63⅞	30	4.60 @4.65	5.50	5.32½
3	4.8690	49⅛	22⅛	14⅜ @14⅝	14⅜ @14½	62	30	4.60 @4.65	5.50	5.32½
4	4.86⅜	49	22⅝	14⅜ @14⅝	14¼ @14½	....	29¼	4.60 @4.65	5.50	5.32½
6	4.86⅞	49⅛	22⅛	14⅜ @14⅝	14¼ @14½	62⅜	29½	4.60 @4.65	5.50	5.32½
7	4.86⅝	49⅛	22⅛	14⅜ @14⅝	14¼ @14½	62¾	29¾	4.60 @4.65	5.50	5.32½
8	4.86⅝	49¼	22¾	14 @14½	14 @14½	60½	29½ @29⅝	4.60 @4.65	5.50	5.32½

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures

New York Metal Exchange.—At the annual meeting last week the following officers were chosen for the ensuing year: President, Robert M. Thompson; vice-president, Adolph Lewisohn; treasurer, Charles S. Trench; managers, B. Hochschild, H. H. Hendricks, L. Nachmann, G. E. Behr, Jesse Lewisohn, William Jay Ives, George W. Jacques and J. H. Lang; arbitration committee, Edmund Hendricks, S. A. Jennings, J. Mitchell Clark, E. A. Caswell and L. Vogelstein.

Copper.—The flat tendency of the speculative market in London, the approaching Easter holidays, and heavy offerings of casting copper at large concessions have combined to give the market a rather weak aspect. While producers of Lake and electrolytic seem reluctant to follow the decline, being well sold ahead, the metal is nevertheless offered very cheaply by second hands, especially abroad. Under the circumstances, transactions have been few and far between, and the closing quotations are rather nominal at 14@14½c. for Lake; 14@14½c. for electrolytic in ingots, cakes and wirebars; 14@14¼ for cathodes; 14c. for casting copper.

The market for standard copper in London, which closed last week at £62, opened on Monday at £62 7s. 6d., but declined sharply on Wednesday, and the closing quotations are cabled as £60 10s.@£60 12s. 6d. for spot, £60 12s. 6d.@£60 15s. for three months.

Refined and manufactured sorts we quote: English tough, £65@£66; best selected, £66 10s.@£67 10s.; strong sheets, £74@£75; India sheets, £71 10s.@£72 10s.; yellow metal, 6¼@6⅝d.

Exports and imports of copper at Atlantic ports in the week ending April 7, and for the year to date, are reported by our special correspondents as follows, in long tons:

Exports:	Week.	Year.
Austria	200	1,796
Belgium	245	611
France	....	7,373
Germany	1,099	6,396
Holland	1,746	11,929
Italy	126	825
United Kingdom	220	4,285
Other countries	78	1,521
Total copper	3,714	34,736
Matte	....	78
Imports:		
Copper	110	6,325
Matte	....	300

Exports were chiefly to Germany, and imports from Mexico, Great Britain and Japan.

Tin.—In the absence of any speculative interest whatsoever, and in view of the reluctance on the part of both consumers and dealers to take hold of the article to a large extent, prices have again ranged within very narrow limits, and the market presents a drooping tendency. Arrivals continue heavy. Prices here have ruled below the parity of London, and at the close we quote 29½@29⅝c. for both spot and futures.

The foreign market, which closed last week at £136 15s., opened on Monday at £136, but declined about £2 later in the day. On Tuesday there was a reaction to £135 12s. 6d., and the closing quotations on Wednesday are cabled as £135 5s.@£135 7s. 6d. for spot, £135 10s.@£135 12s. 6d. for three months.

Visible stocks of tin on April 1 are reported as follows, in long tons of 2,240 lbs.:

	Store.	Afloat.	Totals.
Great Britain	2,834	2,553	5,387
Holland	3,243	438	3,681
U. S., exc. Pacific ports	5,295	5,134	10,429
Totals	11,372	8,125	19,497

This shows an increase of 1,366 tons, as compared with April 1, 1902.

Lead continues in very good demand, with scarcely anything available for immediate delivery. Quotations remain unchanged at 4.52½@4.57½c., St. Louis; 4.60@4.65c., New York.

The foreign market at one time was as low as £12 7s. 6d. for Spanish lead, but the closing quotations are cabled as £12 12s. 6d.@£12 13s. 9d. for Spanish, English being 2s. 6d. higher.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of March 21, that the price of silver for the week has been 12 reales per ounce. The exchange has gone down by 14 centimos, making it at present 33.60 pesetas to £1. The local quotation for pig lead on wharf has been 74.75 reales per quintal, which on above exchange is equal to £12 9s. per ton of 2,240 lbs., f.o.b. Cartagena. Exports of pig lead have been 1,017,928 kgs. to London; 186,148 kgs. to Marseilles; a total of 1,204,076 kgs. There were also 741 kgs. silver bars shipped to Marseilles.

Spelter has been quiet, but steady throughout the week. There were rumors of an impending strike at some of the zinc works in the West, but the same seems to have been averted for the time being. Spot metal remains rather scarce. We quote at the close 5.32½c., St. Louis; 5.50c., New York.

The foreign market is somewhat lower, good ordinaries being quoted at £22 10s.; specials, £22 15s.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of March 21, that the activity in spelter and the steady advance in the price of this metal continues to stimulate local miners in their demand, and prices are now quite double what they were during the latter part of last summer. Shipments for the week were 3,700 tons blende to Antwerp; 800 tons blende and 70 tons calamine to Swansea.

Antimony is in somewhat better demand. We quote: Cookson's, at 8¼c.; Hallett's, 6⅞c.; Hungarian, French, Italian, United States and Japanese, at 6½@6⅝c.

Nickel.—The price is now quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 72½c. per gram.

Quicksilver.—The New York price is $47 per flask for large lots, with a slightly higher figure quoted for small orders. The San Francisco quotation is $44.50@$46 per flask for domestic orders, and $42@$43 for export. The London price is £8 12s. 6d. per flask, with the same quotation from second hands.

Minor Metals and Alloys.—Wholesale prices, f.o.b. works, are as follows:

Aluminum.	Per lb.
No. 1, 99% ingots	33@37c.
No. 2, 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N.Y.)	80c.
Copper, red oxide	50c.
Ferro-Molyb'um (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25%, N. Y.)	55c.

	Per lb.
Ferro-Tungsten (37%)	28c.
Magnesium	$2.75
Manganese, pure (N.Y.)	60c.
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus	45c.
American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Missouri Zinc Ore Market. April 4.

(From Our Special Correspondent.)

A further advance of $1 on the assay basis occurred during the week, reaching a $38 basis on the bulk of ore assaying above 60 per cent zinc, and in the case of two lots of 63 per cent zinc, which sold for $41.50 per ton, the price was equivalent to a basis of $38.50 per ton of zinc contents. Advances on straight bids of $1 and $1.50 were numerously reported, and there was one advance of $2 per ton reported. During four weeks the price has advanced $5 per ton. Settled roads are permitting the moving of the ore accumulation from the Alba-Neck vicinity, yet the shipment has not reached in any one week the average of last year's weekly shipments from the district. The car situation had a deterring effect on the market again this week, reducing the shipment 270 tons of zinc and 377 tons of lead lower than the previous week. One 600-ton lot of ore was purchased, but none of it was moved from inability to secure cars for transportation.

The price of lead was advanced $1 per ton to $60.50, delivered on the cars, for six car-loads, the price on the balance of the sales being the same as the previous week, $59.50 per ton. A year ago the highest price for lead was $43.50 per ton, and for zinc $38 per ton.

Following are the sales of zinc and lead for ores from the various camps of the Joplin District for the week ending April 4, 1903:

	Zinc. Pounds.	Lead. Pounds.	Value.
Joplin	2,544,880	181,060	$56,285
Carterville-Webb City	1,729,400	335,470	42,839
Galena-Empire	1,091,830	117,880	22,069
Duenweg	920,470	23,840	18,198
Alba-Neck	844,710	.....	16,049
Aurora	529,140	20,040	8,832
Zincite	429,600	.....	8,162
Carthage	316,510	.....	6,172
Granby	377,000	27,000	6,160
Carl Junction	269,060	.....	5,381
Oronogo	230,420	490	4,187
Central City	242,420	9,710	3,917
Reeds	215,330	.....	3,876
Spurgeon-Spring City	177,990	31,320	3,779
Cave Spring	150,570	6,670	3,209
Prosperity	135,760	10,200	2,815
Mitchell	54,550	3,170	1,158
District total	10,259,640	766,850	$213,088
Total 14 weeks	127,023,000	14,356,870	$2,438,209

Zinc value, the week, $190,302; lead value, $22,786. Zinc value, 14 weeks, $2,050,131; lead value, $388,078.

Compared with the corresponding 14 weeks of last year the shipment this year has been 14,377,860 lbs. of zinc, and 2,954,960 lbs. of lead less, but higher prices have made the total valuation $112,393 more.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	....	27.77	....	4.075	....	4.37
May	....	29.85	....	4.075	....	4.47
June	....	29.36	....	4.075	....	4.96
July	....	28.38	....	4.075	....	5.27
August	....	28.23	....	4.075	....	5.44
September	....	26.60	....	4.075	....	5.49
October	....	26.07	....	4.075	....	5.38
November	....	25.68	....	4.075	....	5.18
December	....	25.68	....	4.075	....	4.78
Year	....	26.79	....	4.069	....	4.84

Note.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.861c.; for March, 5.174c.

Average Prices of Copper.

Month.	New York Electrolytic. 1903.	New York Electrolytic. 1902.	New York Lake. 1903.	New York Lake. 1902.	London Standard. 1903.	London Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63.85	53.39
April	.....	11.618	.....	11.986	....	52.79
May	.....	11.856	.....	12.226	....	54.03
June	.....	12.110	.....	12.360	....	53.93
July	.....	11.771	.....	11.923	....	52.89
August	.....	11.404	.....	11.649	....	51.96
September	.....	11.480	.....	11.760	....	52.68
October	.....	11.449	.....	11.722	....	52.18
November	.....	11.288	.....	11.533	....	51.03
December	.....	11.430	.....	11.599	....	50.95
Year	.....	11.626	.....	11.887	....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London. Pence.	1903. N. Y. Cents.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.
January	21.98	47.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.63
April	....	....	24.34	52.72	27.30	59.29
May	....	....	23.71	51.31	27.43	59.64
June	....	....	24.17	52.36	27.42	59.57
July	....	....	24.38	52.88	26.96	58.46
August	....	....	24.23	52.52	26.94	58.37
September	....	....	23.88	51.52	26.95	58.26
October	....	....	23.40	50.57	26.62	57.59
November	....	....	22.70	49.07	26.12	56.64
December	....	....	22.21	48.03	25.46	55.10
Year	....	....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of Company.	Date.	Per Share.	Total.	Total to Date.
†Central Coal & C., com	April 15	1.50	76,875	397,500
†Central Coal & C., pf.	April 15	1.25	23,437	749,998
*Daly West, Utah	April 15	.60	108,000	2,691,000
†Dixon Crucible	April 15	1.00	7,345	.....
†Doe Run, Mo.	April 15	1.50	22,500	582,072
*Empire State, Idaho	April 15	.05	25,277	1,662,770
†Iowa, Colo.	April 15	.01	16,667	303,503
§Penna. Salt	April 15	3.00	150,000	13,300,000
†Phila. Gas, common	May 1	1.50	231,406	2,954,019
†Pittsburg Coal, pf.	April 15	1.75	519,771	7,276,794
†Tenn. Coal, Iron & R.R.	May 1	2.00	4,960	297,135
United Verde Copper	April 1	.75	225,000	13,260,322
†United Zinc, com.	April 15	.05	3,882	22,961
†United Zinc, pf.	April 15	.50	8,520	99,095
†Va.-Car. Chem., pf.	April 15	2.00	240,000	6,540,000
§Westmoreland Coal	April 15	1.50	375,000	7,875,000

* Monthly. † Quarterly. § Semi-annual.

ASSESSMENTS.

Name of Company.	Location. No.	Delinq.	Sale.	Amt.
Alaska	Utah ..	Apr. 14	Apr. 30	.03
Alma	Cal. ..	Apr. 27	.....	.15
Caledonia	Nev. ..	Apr. 15	May 4	.15
Coe Quarts	Cal. ..	Apr. 14	.....	.04
Con. New York	Nev. 17	Apr. 7	Apr. 28	.05
Fremont Con.	Cal. ..	Apr. 20	.....	.20
Gold Hill	Cal. ..	Apr. 15	.....	.12
Gould & Curry	Nev. ..	Apr. 17	May 6	.15
Hale & Norcross	Nev. ..	Apr. 30	May 28	.10
Jenny Lind	Cal. ..	Apr. 13	.....	.01½
Kennedy	Cal. ..	Apr. 20	.....	1.00
Kern Canyon Oil	Cal. ..	Apr. 27	.....	.06
Occidental	Nev. 41	Mar. 24	Apr. 14	.05
Ophir	Nev. ..	Apr. 10	Apr. 30	.15
Overman	Nev. 12	April 7	April 28	.10
Provident Oil	Cal. ..	May 7	.....	.03½
Shenandoah Con.	Cal. ..	Apr. 14	.....	.02
Silver Shield	Utah 4	Apr. 28	May 15	.02
Tonopah & Salt Lake	Nev. 1	Mar. 28	Apr. 17	.10
Wabash	Utah 2	Apr. 21	May 14	.05
Yellow Jacket	Nev. ..	Apr. 30	June 5	.15

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	Apr. 1. H.	Apr. 1. L.	Apr. 2. H.	Apr. 2. L.	Apr. 3. H.	Apr. 3. L.	Apr. 4. H.	Apr. 4. L.	Apr. 6. H.	Apr. 6. L.	Apr. 7. H.	Apr. 7. L.	Sales
Acacia, Colo	$1									.05				1,000
Alice, Mont.	25					.30				.28				250
Amalgamated c., Mont	100	67⅝	66¾	66¾	65½	66⅝	64⅛	65⅛	64⅞	66¼	65¼	65⅝	63⅞	131615
†Anaconda c. Mont	25	115¾	115	111	.....	111	110	.....	.....	.....	.....	110	107	1,600
Anaconda Gold, Colo.	5	.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,000
Best & Belcher, Nev.	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 10	.....	200
Breece, Colo.	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.30	.....	100
Brunswick, Cal.	1	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,000
Chollar, Nev.	3	.33	.....	.32	.....	.....	.....	.....	.....	.....	.....	.28	.....	2,000
Chrysolite, Colo.	50	.....	.....	.....	.....	.05	.....	.....	.....	.....	.....	.....	.....	200
C. K. & N., Colo.	1	.....	.....	.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,000
Comstock T., s., Nev.	3	.10	.....	.09½	.....	.....	.....	.....	.....	.09½	.....	.09½	.....	3,300
Comst T. Bonds	100	.08	.....	.08	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,000
Con. Cal. & Va., g. s. Nev	2½	1.60	.....	.....	.....	.....	.....	.....	.....	1 50	.....	.....	.....	2,100
Cripple Creek c., Colo.	1	.05	.....	.....	.....	.....	.....	.....	.....	.05	.....	.....	.....	2,500
Daly, Utah	20	.....	.....	2 75	.....	.....	.....	.....	.....	.....	.....	.....	.....	150
Elkton g., Colo.	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold Dollar, Colo.	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.05	.....	1,000
Gould & Curry, Nev.	3	.31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	500
Greene Con., c., Mex.	10	24.75	23.75	24.50	24.25	24.25	24.00	24.00	23.75	24.25	23.75	24.00	23.75	7,620
Hale & Norcross	3	.....	.....	.62	.....	.65	.....	.....	.....	.....	.....	.....	.....	600
Homestake, S. Dak.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Isabella, g., Colo.	1	.....	.....	.....	.....	.21	.....	.....	.....	.....	.....	.19	.....	1,500
Jack Pot, Colo	1	.....	.....	.12	.....	.....	.....	.....	.....	.....	.....	.....	.....	400
Justice, Nev.	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Leadville, Colo.	10	.....	.....	.....	.....	.03	.....	.....	.....	.04	.....	.04	.....	850
Mexican, Nev.	3	1 00	.....	.....	.....	.....	.....	.....	.....	1.00	.....	.....	.....	600
Mollie Gibson, Colo.	5	.06	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	800
Moon Anchor, Colo.	5	.....	.....	.....	.....	.....	.....	.....	.....	.09	.....	.....	.....	500
Ontario, Utah	100	5.75	.....	.....	.....	5.75	.....	5 25	.....	.....	.....	5.50	.....	450
Ophir, s., Nev	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	.....	400
Pharmacist, Colo.	1	.05	.....	.....	.....	.04	.....	.....	.....	.....	.....	.....	.....	1,500
Phoenix, Ariz.	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Portland, Colo	10	1.40	.....	.....	.....	1.40	.....	.....	.....	.....	.....	1.40	.....	600
Potosi, Nev.	3	.....	.....	.....	.....	.26	.....	.....	.....	.23	.22	.....	.....	1,300
Quicksilver, pfd.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Savage, Nev.	2½	.....	.....	.....	.....	.30	.....	.....	.....	.....	.....	.....	.....	100
Small Hopes, Colo.	20	.....	.....	.....	.....	.....	.....	.....	.....	.52	.50	.52	.....	1,300
Standard, Cal.	10	3.40	3.35	.....	.....	3 25	.....	.....	.....	.....	.....	3.30	.....	550
Tenn. c., Tenn	25	30 50	30.25	30 63	30.00	30.50	29.75	30.00	29.75	29 88	29.50	29.88	29.75	3,000
Union Con., Nev.	2½	.35	.93	.....	.....	.....	.....	.....	.....	.90	.....	.....	.....	400
Union Cop., N. C.	10	.....	.....	.....	.....	3.00	.....	2.38	.....	2.50	2.38	2.50	.....	2,200
White Knob, g. s., Ida	100	.....	.....	10.50	10.00	10.25	.....	.....	.....	.....	.....	.....	.....	110
Work, Colo.	1	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,000
Yellow Jacket, Nev.	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	500

Total sales 180,795 shares.

BOSTON, MASS.*

Name of Company.	par val	Shares listed.	Apr. 1. H.	Apr. 1. L.	Apr. 2. H.	Apr. 2. L.	Apr. 3. H.	Apr. 3. L.	Apr. 4. H.	Apr. 4. L.	Apr. 6. H	Apr. 6. L.	Apr. 7. H.	Apr. 7. L.	Sales
Adventure Con., c.	$25	100,000	10¼	.....	10	.....	10⅛	10¼	.....	.....	10½	.....	10	.....	490
Aetna Cons., g	5	1,000,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	50
Allouez	25	80,000	7⅛	7⅛	.....	.....	7⅜	7	7⅛	7	7⅛	7	7⅛	6¼	2,630
Amalgamated, c.	100	1,538,879	67⅛	66½	66¾	65⅜	66⅞	64⅛	66	65	66¼	65⅜	65¾	63¼	25,670
Am. Z. L. & Sm.	25	60,000	.....	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	25
Anaconda, c.	25	1,200,000	29	.....	29	.....	28	.....	.....	.....	.....	.....	.....	.....	65
Arcadian, c.	25	150,000	.....	.....	.....	.....	4⅛	4	4⅛	4	.....	.....	4	3¾	470
Arnold	25	60,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Atlantic, c.	25	100,000	.....	.....	11¾	.....	12	11½	12	.....	12	11½	12	11¾	563
Bingham Con., g. s.	50	150,000	31½	31¼	31½	31	31	30¾	31¼	.....	31	.....	31½	30¾	1,085
Bonanza	10	300,000	.....	.....	.....	.....	.75	.....	.....	.....	.80	.....	.....	.....	70
British Columbia	15	250,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cal. & Hecla, c.	25	100,000	530	.....	.....	.....	527	525	.....	.....	.....	.....	525	520	39
Catalpa	10	300,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Centennial, c.	25	30,000	29¼	25¼	25⅜	25	25½	25	.....	.....	25½	25	24½	23½	3,095
Central Oil	25	60,050	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. Mercur, g.	5	1,000,000	1 1/16	.....	1 1/16	.....	1 1/16	1	1 1/16	1⅛	1 1/16	.....	1 1/16	1¼	3,630
Continental Zinc	25	22,000	.....	.....	.....	.....	13	.....	.....	.....	.....	.....	.....	.....	12
Copper Range Con.	100	285,000	64¾	63½	64	63	63⅞	62⅝	63⅞	62⅝	64⅛	63	63¾	61¾	10,561
Daly-West., g. s.	20	180,000	.....	.....	44	42½	.....	.....	43	42¼	42⅜	42¼	42⅜	42¼	686
Dominion Coal	100	150,000	111	102	108¼	104¾	110¾	107⅜	110	.....	111	110	111	105	7,690
Dominion Coal, pf.	100	30,000	.....	.....	117	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dominion I & S.	100	100,000	29¼	24	28	25	28⅛	27⅛	28¼	27½	29	28¼	28¾	28	19,169
Elm River	12	100,000	4	.....	3 15/16	.....	4	3⅜	3⅜	3 15/16	11	.....	3⅝	3⅝	1,130
Franklin, c.	25	100,000	11	.....	.....	.....	11	.....	11¾	11	11	.....	11	10⅝	490
Guanajuato, Con.	5	385,000	1⅝	1½	1½	.....	.....	.....	1⅝	.....	1 5/16	1½	1⅝	1¾	2,150
Humboldt	25	46,000	.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200
Isle Royale Con., c.	25	385,000	13¼	12¾	.....	.....	12¼	.....	.....	.....	.....	.....	12	.....	115
Mass Con., c.	25	100,000	11¼	10¾	11	.....	11	10½	.....	.....	*11	10¾	10½	10¼	611
Mayflower, c.	25	100,000	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	110
Michigan, c.	25	100,000	.....	.....	9	.....	9¼	.....	9	.....	.....	.....	9	8¾	120
Mohawk, c.	25	100,000	53½	53	53½	53	53	51	52¾	51½	52	.....	52	50	2,150
Mont. Coal & Coke	25	200,000	7¼	.....	7¼	.....	.....	.....	.....	.....	7⅝	.....	.....	.....	400
Mont'l & Boston, c.	5	570,000	1⅛	.....	1¼	.....	1 1/16	.....	1 1/16	.....	.....	.....	1⅛	1 1/16	2,160
New Idria, g.	5	100,000	7¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
Old Colony, g.	25	100,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Old Dominion, c.	25	150,000	18½	18	.....	.....	.....	.....	.....	.....	18⅞	.....	18⅛	18	325
Osceola, c.	25	98,150	71¾	70	71	70¼	70¾	69	70¼	69½	70¼	69½	70	.....	1,722
Parrot, s. c.	10	228,850	30¼	30	30	29⅝	29¾	29	29	28	29	28⅝	28	.....	1,305
Phoenix Con., c.	25	100,000	.....	.....	.....	.....	6¼	.....	6¼	.....	.....	.....	6¼	.....	160
Quincy, c.	25	100,000	.....	.....	.....	.....	.....	.....	.....	.....	116	115	115	.....	58
Rhode Island, c.	25	100,000	3	.....	3	.....	3	.....	.....	.....	.....	.....	2¾	.....	250
Santa Fe, g. c.	10	250,000	.....	.....	2⅜	2¼	2¼	.....	2¼	.....	2¼	.....	2¼	2	380
Shannon, c.	10	183,298	13¾	13¼	13¾	13½	13¼	13	13⅜	13⅛	13⅜	13¼	13¾	13	2,950
Tamarack, c.	25	60,000	165	160	160	.....	155	.....	157	155	150	145	147	.....	161
Tecumseh	25	80,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	110
Tennessee	25	175,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trimountain	25	100,000	92	90	90	.....	90	.....	.....	.....	.....	.....	91	89¾	455
Trinity, c.	25	100,000	11	.....	10¾	10	10¾	9¾	10¼	9½	10	9¾	10	9¾	1,805
United States, g.	25	419,000	24⅝	24½	24⅝	24⅜	25	24¾	24⅞	24½	24⅝	24½	24⅜	24¼	8,528
U. S. Coal & Oil	25	240,000	14⅞	14¾	14⅞	14½	.....	.....	14⅜	14¼	14¼	.....	14⅞	14¼	1,815
Utah Con., g.	5	300,000	29¾	29¼	29½	29	29	28¼	29	28¼	29	28¼	28¾	27½	6,210
Victoria, c.	25	100,000	6¾	.....	6¼	.....	6¾	6¼	6¼	.....	6¼	.....	6¼	6¼	500
Winona, c.	25	100,000	‡10¾	10¼	‡10¼	.....	‡10¾	9½	10¼	.....	‡10¾	10	‡10	9¾	1,340
Wolverine, c.	25	60,000	†73¾	73	73	.....	72¼	.....	71¾	71½	71	.....	72	71	442
Wyandot	25	100,000	2	1¾	.....	.....	1¾	.....	.....	.....	1¾	.....	1¾	.....	615

*** Ex-Rights * Boston Stock Exchange. † Ex Dividend. ‡ Assessment Paid. Total sales, 114,752 shares.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val	Apr 1. H.	Apr 1. L.	Apr. 2. H.	Apr. 2. L.	Apr. 3. H.	Apr. 3. L.	Apr. 4. H	Apr. 4. L.	Apr. 6. H.	Apr. 6. L.	Apr. 7. H.	Apr. 7. L.	Sales
Ailis-Chalmers, U. S.	100	18	17	.....	.....	.....	.....	.....	.....	17	.....	17	.....	200
Ailis-Chalm's, pf, U.S.	100	87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Agr. Chem., U.S.	100	26	22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34
Am. Agr. Chem. pf, U.S.	100	80	78	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Sm. & Ref., U.S.	100	49¾	49	49⅝	48¾	48	48⅛	49	.....	49	48⅞	49	48½	11,750
Am. Sm. & Ref. pf, U.S.	100	93¾	93⅝	.....	.....	93	.....	.....	.....	93½	92	93	.....	1,755
Am. Steel & Fdy., U.S.	100	15⅞	.....	14	.....	.....	.....	.....	.....	14¾	14	14¾	14	700
Am. S. & Fdy. pf., U.S.	100	.....	.....	.....	.....	.....	.....	40½	.....	61	.....	.....	.....	600
Col. Fuel & I., Colo.	100	64¼	59¾	61	56¼	56¾	54	55⅞	54⅜	57⅛	55⅜	56½	55	51,450
Col. & H. C. & I., Colo.	100	20½	.....	20	.....	.....	.....	.....	.....	.....	.....	20	19½	800
†Crucible Steel, U. S.	100	18⅞	18⅜	18⅜	18¼	18⅜	18⅛	18⅜	18⅛	18⅜	18⅛	18⅜	18	2,436
†Crucible Steel, pf, U S	100	84	83⅜	83¾	83¼	83½	.....	83¼	82¾	83	82	82⅜	82	6,871
†Mong. R. Coal, Pa.	100	11	.....	11	.....	11	10½	.....	.....	.....	.....	.....	.....	1,210
†Mong. R. Coal pf, Pa	100	.....	.....	39⅜	.....	.....	.....	.....	.....	39⅜	.....	39⅜	39¼	630
National Lead, U.S.	100	.....	.....	25⅞	25	25	24½	25	.....	.....	.....	25⅛	25¼	1,350
National Lead pf, U.S.	100	.....	.....	91⅛	.....	.....	.....	.....	.....	.....	.....	91⅛	91⅛	400
†Phila Nat. Gas	100	.....	.....	.....	.....	45	.....	.....	.....	.....	.....	.....	.....	170
†Phila Nat. Gas, pf	100	.....	.....	.....	.....	.....	.....	.....	.....	45½	45⅛	.....	.....	.....
†Pittsburg Coal, Pa	100	28¾	28½	28½	.....	28¼	.....	.....	.....	28⅛	28¼	28¼	28	1,070
†Pittsburg Coal pf, Pa	100	91	90⅝	91	.....	90¾	90½	.....	.....	91	90⅞	91¼	91	1,014
Republic I & S., U.S.	100	19¾	19⅛	19¾	19⅛	19⅝	19	19⅛	.....	19¾	.....	19⅝	.....	2,800
Republic I. & S., pf, U.S.	100	77	.....	77⅛	.....	77	76¼	77⅛	7·	.....	.....	.....	.....	1,550
Sloss-Shef S. & I., Ala.	100	58½	54	57	55	.....	.....	56⅛	55½	57⅝	56¼	56	55½	3,550
Sloss-Shefs. & I. pf, Ala.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard Oil, U.S.	100	679½	.....	678	675	674	670	670	.....	673	.....	671	670	157
Tenn. C. I. & R. R., Ala.	100	65¼	64⅜	64	63¼	63⅞	62½	64	63¼	64⅞	63¼	64⅛	63	11,800
U. S. Red & Ref., U. S.	100	32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
U. S. Red & R. pf., U.S.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
U.S. Steel Corp., U.S.	100	36¼	.....	36	35¾	36	35¼	36⅛	35⅜	36¼	35⅝	36⅛	35	67,995
U.S. Steel Corp. pf, U.S.	100	86⅝	85¼	86¼	85⅞	86¼	85⅜	86¼	85¼	86⅜	86	86⅜	85⅝	41,964
Va.-Car Chem., U.S.	100	62⅝	.....	62	.....	62⅜	61¾	.....	.....	62½	62	62	61¾	2,241
Va.-Car Chem. pf, U.S.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	122¼	.....	230
Va. I. C. & Coke, U. S.	100	.....	.....	34	.....	33¼	33	.....	.....	34½	.....	.....	.....	700
		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* New York Stock Exchange. † Pittsburg Stock Exchange. Total sales, 215,727 shares.

COLORADO SPRINGS, COLO.*

Name of Company.	Par val	Mar. 30. H.	Mar. 30. L.	Mar. 31. H.	Mar. 31. L.	Apr. 1. H.	Apr. 1. L.	Apr. 2. H.	Apr. 2. L.	Apr. 3. H.	Apr. 3. L.	Apr. 4. H.	Apr. 4. L.	Sales
Acacia	$1	.09	.07¾	.09	.07¾	.09½	.09½	.09¼	.09½	.09¼	.09½	.09¼	.....	9,800
Am. Con.	1	.02⅝	.02⅛	.02⅝	.02½	.02⅝	.02½	.....	.02½	.02⅝	.02½	.02¼	.....	8,500
Anaconda	1	.16	.15	.16	.15	.15	.....	.20	.....	.20	.....	.18	.15½	500
Ben Hur	1	.....	.01⅞	.....	.01⅞	.02⅛	.02¼	.....	.02	.02⅛	.02¼	.02½	.02	.....
Blue Bell	1	.07½	.....	.07½	.....	.07	.....	.07	.....	.07	.....	.07	.....	.....
C. K. & N.	1	.19¾	.17½	.19¾	.17¾	.18¾	.....	.19¾	.18¾	.19¾	.18¼	.19	.17¾	1,000
C. C. & M.	1	.02½	.02	.02½	.02	.02½	.02¼	.02⅝	.02¼	.02¼	.02⅛	.02⅛	.02¼	.....
C. C. Con.	1	.05¼	.04½	.05¼	.04½	.....	.....	.05	.06	.05⅝	.....	.....	.05	500
Coriolanus	1	.04	.....	.04	.....	.03½	.....	.....	.04	.....	.....	.04	.....	.....
De Moines	1	.....	.02½	.....	.02¼	.....	.03	.....	.03	.03¼	.03	.03½	.03	1,000
Dr. Jack Pot.	1	.09¼	.08½	.09¼	.08¾	.09¼	.09	.09¼	.08¾	.09¼	.08¾	.09¼	.08½	.....
Elkton Con.	1	.35¾	.34¾	.35¾	.34¾	.37½	.37	.37½	.....	.38	.37¼	.37⅝	.36½	4,500
El Paso	1	.58	.56¾	.58	.56¾	.61	.60	.62	.60½	.62	.61	.62	.61	3,200
Fannie Rawlings	1	.03	.02½	.03	.02½	.04	.02½	.04	.02½	.04	.02½	.04	.02½	.....
Findley	1	.13	.11¾	.13	.11¾	.12½	.12½	.13	.12¼	.12¾	.12½	.12¾	.12¼	9,000
Gold King	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold Dollar Con.	1	.04¾	.04⅝	.04¾	.04⅝	.05½	.05	.05¼	.05¼	.05½	.05	.05¼	.05	56,000
Golden Cycle	1	.70	.67¾	.70	.67	.75	.70	.73½	.73	.74	.73	.75½	.74	6,900
Golden Fleece	1	.11	.05	.11	.05	.....	.....	.10	.....	.10	.....	.11	.....	.....
Gould	1	.04¼	.03¼	.04¼	.03½	.04⅜	.03¾	.04½	.03¾	.04¼	.03½	.....	.03½	.....
Hart	1	.....	.02	.....	.02	.....	.02	.....	.02	.....	.02	.02	.....	.....
Isabella	1	.18½	.18¼	.18⅝	.18	.19	.18⅝	.18⅞	.18	.17⅝	.17	.16	.15½	27,000
Jack Pot	1	.10	.08½	.09½	.08½	.....	.09	.09½	.08½	.....	.....	.08¾	.09½	.08¾	.....
Last Dollar	1	.70	.....	.70	.10	.67½	.....	.67	.....	.....	.50	.10	.50	.....
Lexington	1	.05	.04¼	.04⅝	.04¼	.05	.04⅝	.05	.04⅝	.05	.04⅝	.05	.04⅝	3,000
Little Puck	1	.03¼	.03	.03½	.02⅞	.03⅜	.03¼	.03⅜	.03⅛	.03¼	.03	.03	.02⅞	10,300
Mollie Gibson	1	.07	.06½	.....	.03½	.07	.....	.07	.....	.07	.05¼	.....	.05½	.07	1,000
Moon Anchor	1	.08¼	.08	.09	.08	.08½	.....	.....	.8	.09	.08	.09	.08	1,000
New Haven	1	.02½	.02¼	.02⅝	.02¼	.03	.02⅝	.03	.02¾	.03	.02⅝	.03	.....	2,000
Pharmacist	1	.04¼	.04¼	.04¼	.04¼	.04½	.....	.05	.04⅝	.05	.04½	.04⅝	.04¾	3,000
Pinnacle	1	.04⅝	.04¾	.04¾	.04½	.04¾	.04¼	.04⅝	.04¼

STOCK QUOTATIONS.

MEXICO*. March 27.

Name of Company	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango.				
Ca. Min. de Penoles	2,500	$50.00	$4,000	$4,500
San Andres de la Sierra	200	.....	1,000	.....
Guananjuato.				
Angustias, Pozos	2,400	5.00	80	90
Cinco Senores y An., aviadoras	2,000	15.00	215	225
Cinco Senores y An., aviada	400	10.00	215	210
Providencia, San Juan de la Luz	6,000	2.00	170	185
Queensland y Australia	300	.....	110	120
Guerrero.				
Garduno y Anexas	7,200	.....	35	60
Hidalgo.				
Amistad y Concordia	9,600	5.30	70	72½
Carmen, aviada	1,100	.....	115	125
Guadalupe Fresnillo mill	1,000	.....	250	300
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora	1,536	.....	1,200	1,250
La Blanca, aviada	768	.....	900	915
La Reina y An., aviadora	5,600	.....	25	21
Maravillas y An., aviador	1,680	.....	.....	.....
Maravillas el Lobo	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte	2,554	10.00	650	700
Santa Ana y An., aviadora	1,800	.....	30	35
Santa Ana y An., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,600	.....	.....	7½
Sta. Gertrudis y An., aviadora	28,800	1.00	80	81
Santo Tomas Apostol aviadoras	5,100	.....	1	2
San Felipe de Jesus, aviadora	3,600	.....	30	40
San Felipe de Jesus, aviada	1,200	.....	10	12
San Rafael y An., Trompillo	1,200	12.00	1,030	1,050
San Rafael y An., aviada	1,200	$8.00	$400	$410
Soledad, aviada	960	5.00	315	325
Sorpresa, aviada	960	5.00	280	300
Mexico.				
Alacran	2,400	.....	30	40
Buen Despacho	3,000	.....	55	60
Dos Estrellas	3,000	30.00	1,980	2,000
La Esperanza (El Oro)	3,000	10.00	1,180	1,200
La Reforma, aviadores	2,000	.....	58	60
Santa Ana, Esperanza	2,400	.....	70	90
Michoacan.				
Luz de Borda, aviadora	3,000	.....	43	45
Luz de Borda, aviada	1,000	.....	10	14
San Luis Potosi.				
Concepcion y An	3,000	.....	90	130
El Barreno, aviadora	2,000	2.00	53	55
Sta. Maria de la Paz	2,400	10.00	.....	.....
San Diego y Annexas	2,400	4.00	10	15
Zacatecas.				
Asturiana y An	2,500	.....	50	70
Candelaria y Pinos	2,500	10.00	280	290
Esperanza y An	2,400	.....	50	40
Lourdes	2,500	.....	20	30
Luz de Minillas, pagadoras	2,000	.....	25	30
San Carlos y Annexas	2,500	20.00	150	190
Sta. Maria de Gaud	2,500	10.00	70	80
Miscellaneous.				
Bartolome de Medina	2,000	1.50	75	85
Guadalupe Hacienda	10,000	3.00	.....	.....
La Luz Hac. (Pachuca)	3,750	.....	300	305
La Reina (Chihuahua)	192	.....	.....	.....
Naica (Chihuahua)	100	.....	6,000	.....
Natividad (Oaxaca) aviadora	1,800	8.00	700	900
Natividad (Oaxaca) aviadas	600	4.00	700	900
San Francisco Hac	6,000	1.00	52	55
Santa Ana Huantla Morelos	4,000	.....	.....	.....
Union Hacienda	3,000	5.00	240	260

*Values are in Mexican currency.

SAN FRANCISCO (*By Telegraph*).

Name of Company.	April. 6.	April. 7.	Name of Company.	April. 6.	April. 7.
Belcher	.55	.51	Justice	.13	.12
Best & Belcher	2.00	1.75	Mexican	1.10	1.05
Caledonia	2.25	2.25	Occidental Con	.37	.36
Challenge Con	.56	.55	Ophir	1.55	1.50
Chollar	.31	.27	Overman	.54	.51
Confidence	1.25	1.25	Potosi	.24	.21
Con. Cal. & Va	1.60	1.55	Savage	.26	.22
Con. Imperial	.02	.02	Sierra Nevada	.24	.....
Crown Point	.30	.28	Union Con	.96	.95
Gould & Curry	.28	.25	Utah Con	.27	.26
Hale & Norcross	.62	.55	Yellow Jacket	.38	.34

SALT LAKE CITY.* Apr. 3.

Name of Company	Shares.	Par Val	High	Low	Sales.	Name of Company	Shares.	Par Val	High	Low	Sales.
Ajax	.....	.....	.27	.27	200	May Day	.....	.....	.20	.18¾	40,280
Ben Butler	.....	.....	.09	.09	1,000	M. Washington	.....	.....	.04¾	.04	11,000
Boss Tweed	.....	.....	.27⅝	.25	4,100	N. Y. Bonanza	.....	.....	.25	.23⅜	5,500
California	300,000	$1	.06¾	.06	8,860	Sacramento	1,000,000	5	.27	.26⅜	7,500
Carisa	500,000	1	.12¼	.12¼	300	Silver Shield	.....	.....	.07	.06½	3,800
Century	150,000	1	.56	.47½	2,700	Star Con	500,000	1	.14	.13⅛	25,000
Con. Mercur	1,000,000	5	1 57	1.50	5,317	Sunshine	.....	.....	.09	.08¾	1,200
Daly	.....	.....	3.00	2.25	605	Swansea	.....	.....	.80	.80	300
Daly-Judge	300,000	1	10.35	9.90	2,906	Utah	.....	.....	.73½	.72	4,100
Daly-West	180,000	20	43.00	42.07½	2,725	Valeo	.....	.....	.14½	.14¼	300
Grand Central	250 000	1	5 20	5.20	200	Victor	500,000	1	.28	.23½	11,325
L. Mammoth	150,000	1	.56	.48⅜	20,000	Wabash	.....	.....	.30¼	.26¾	11,000
La Reine	.....	.....	.05	05	3,500	Yankee Con	500 000	1	.41¼	.39½	2,000

All mines are in Utah. *By our Special Correspondent. Total sales, 153,156 shares.

ST. LOUIS, MO.* Apr. 4.

Name.	Capital Stock.	Par Val.	Prices. Bid.	Prices. Ask.	Name.	Capital Stock.	Par Val.	Prices. Bid.	Prices. Ask.
Am. Nettie, Colo	$3,003,000	$10	$0.50	$0.70	Columbia Lead, Mo.	$500,000	10	11.00	12.50
Catherine Lead, Mo.	500,000	10	1.50	3.00	Con. Coal, Ill	500,000	100	21.00	22.00
Central Coal & C	1,875,000	100	66.50	67.00	Doe Run Lead Co.	1,500,000	100	105.00	110.00
Central C. & C., pf.	1,875 000	100	73 00	76 00	Granite Bimet., Mt.	1,000,000	10	.75	.90
Central Lead, Mo	1,000,000	10	130.00	145.00	St. Joe Lead, Mo	6,000,000	10	16.00	17.00

*From our Special Correspondent.

PHILADELPHIA, PA.*

Name and Location of Company.	par val	Apr. 1. H.	Apr. 1. L.	Apr. 2. H.	Apr. 2. L.	Apr. 3. H.	Apr. 3. L.	Apr. 4. H.	Apr. 4. L.	Apr. 6. H.	Apr. 6. L.	Apr. 7. H.	Apr. 7. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement	10	8	.....	8	.....	.....	.....	.....	.....	8	.....	7⅞	.....	305
Cambria Iron, Pa	50	.....	.....	48	47¾	47⅞	.....	.....	.....	.....	.....	47¼	.....	135
Cambria Steel, Pa	50	24¾	.....	24¼	24⅝	24¾	24⅝	24⅛	.....	24¼	24⅜	24¼	24⅜	1,432
Penn. Steel, pfd	100	.....	.....	93¾	.....	95	.....	.....	.....	.....	.....	.....	.....	3
Susq. I. & S., Pa	5	2¼	.....	.....	.....	2½	.....	2¼	.....	2½	.....	.....	.....	1,045
United Gas I., Pa	50	107½	106¾	108⅜	106	106½	106	108⅜	106	109⅝	108⅛	108¾	107⅝	4,842
Warwick I. & Steel	10	.....	.....	.....	.....	5⅜	.....	.....	.....	.....	.....	5⅛	.....	13

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 7,892 shares.

LONDON. March 27.

Name and Country of Company	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Latest dividend. Date	Quotations. Buyers. £ s. d.	Quotations. Sellers. £ s. d.
Alaska-Treadwell, g., Alaska	200,000	5 0 0	1 6	Jan., 1903	4 10 0	4 15 0
Anaconda, c. s., Montana	1,200,000	5 0 6	2 0	Nov., 1902	5 16 3	5 18 9
Arizona, c., Def., ord	63,444	1 0 0	5 6	Feb., 1903	8 0 0	8 10 0
Arizona, pref., ord	316,350	1 0 0	5 6	Feb., 1903	8 2 6	8 7 6
Camp Bird, g., Colorado	738,000	1 0 0	0 7½	Mar., 1903	1 10 0	1 11 0
Copiapo, c., Chile	112,500	2 0 0	6 10½	Mar., 1903	2 5 0	2 10 0
De Lamar, g. s., Idaho	80,000	1 0 0	2 0	Nov., 1902	11 3	13 9
Enterprise, g., British Col	185,000	1 0 0	.....	.....	2 6	7 6
El Oro, g., Mexico	1,000,000	1 0 0	1 8	Dec., 1902	1 10 0	1 12 6
Frontino & Bolivia, g., Colombia	128,662	1 0 0	3 0	July, 1901	17 6	1 0 0
Le Roi, g., British Col	200,000	5 0 0	5 0	Nov., 1899	1 10 0	1 12 6
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	May, 1902	17 6	1 0 0
Mesquital, Mexico	250,000	2 0	3	Feb., 1903	4 0	5 0
Montana, g. s., Montana	657,128	1 0 0	6	April, 1899	1 9	2 3
Mountain, c., Cal	175,000	5 0 0	4 0	Nov., 1902	3 7 6	3 12 6
Stratton's Independence, Colorado	1,000,007	1 0 0	6	April, 1902	9 3	9 9
St. John del Rey., g., Brazil	548,285	1 0 0	6	Dec, 1902	17 0	18 0
Utah Con., g. c., (Highland Boy), Utah	300,000	1 0 0	7 0	Jan., 1903	5 10 0	6 0 0
Ymir, g., British Col	200,000	1 0 0	1 0	Mar., 1902	8 9	11 3
European:						
Linares, l., Spain	15,000	3 0 0	9	Oct., 1902	3 15 0	4 5 0
Mason & Barry, c., sul., Port'g'l	185,172	1 0 0	13 0	May, 1902	3 17 6	4 2 6
Rio Tinto, c., Spain	325,000	5 0 0	27 6	Apr., 1903	50 10 0	50 15 0
Rio Tinto, pref., Spain	325,000	5 0 0	2 6	Apr., 1903	6 0 0	6 5 0
Tharsis, c., Spain	625,000	2 0 0	6 0	Apr , 1903	4 12 6	4 17 6
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	495,388	1 0 0	1 6	Jan., 1900	2 0 0	2 2 6
Briseis, Tin, Tasmania	600,000	1 0 0	.....	.....	8 6	9 6
Broken Hill Pr'p., s., N. S. Wales	980,000	8 0	1 0	Feb., 1903	1 12 6	1 15 0
Cosmopolitan Prop., W. Australia	385,000	1 0 0	6	July, 1902	14 9	15 3
Golden Horse Shoe, W. Australia	300,000	5 0 0	6 0	Nov., 1902	11 1 3	11 6 3
Great Fingall Con., W. Australia	250,000	1 0 0	5 0	Sept., 1902	7 13 9	7 16 3
Great Bo'd'r Pr'p., W. Australia	1,750,000	2 0 0	6	Mar., 1903	1 1 6	1 2 0
Ivanhoe Gold Corp. W. Australia	500,000	5 0 0	4 0	Jan., 1903	8 18 9	9 1 3
Kalgurli, g., W. Australia	120,000	1 0 0	2 6	Apr., 1903	4 6 3	4 8 9
Lake View Cons., g., W. Australia	250,000	1 0 0	rts.	Aug., 1902	2 16 3	2 18 9
Mt. Lyell M. & R. I., c., Tasmania	275,000	3 0 0	1 0	Apr., 1903	3 6 3	3 8 9
Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Mar., 1903	4 0 0	4 5 0
Waihi, g., New Zealand	497,412	1 0 0	2 6	Mar., 1903	4 18 9	5 1 3
Indian:						
Champion Reef, g., Colar Fields	473,000	10 0	5 0	Jan., 1903	7 1 3	7 3 9
Mysore Gold, Colar Fields	530,000	10 0	5 0	Mar., 1903	7 0 0	7 2 6
Nundydroog, g., Colar Fields	484,000	10 0	1 6	Mar., 1903	2 6 3	2 8 9
Ooregum, g., Colar Fields	343,000	10 0	1 3	Dec., 1902	1 16 3	1 18 9
Ooregum, pref., g., Colar Fields	240,000	10 0	1 3	Dec., 1902	2 5 0	2 7 6
African:						
Angelo, g. Transvaal	660,000	1 0 0	6 0	Feb., 1903	7 5 0	7 7 6
Bonanza, g., Transvaal	200,000	1 0 0	12 0	Feb., 1903	5 2 6	5 7 6
British South Africa	4,436,019	1 0 0	rts.	May, 1899	3 3 9	3 6 3
Cape Copper, S. Africa	300,000	2 0 0	8 0	Jan., 1902	2 17 6	3 2 6
Cape Copper, pref., S. Africa	75,000	2 0 0	2 3	Jan., 1903	3 2 6	3 7 6
City and Sub'n (New), g., Transvaal	340,000	4 0 0	8 0	Aug., 1899	6 10 0	6 12 6
Crown Reef, g., Transvaal	120,000	1 0 0	11 0	Apr., 1903	17 15 0	18 0 0
De Beers Con., d., pref., Cape Colony	800,000	2 10 0	10 0	Mar., 1903	19 10 0	19 12 6
De Beers Con., def	1,000,000	2 10 0	12 6	Mar., 1903	21 7 6	21 10 0
East Rand, Prop, Transvaal	970,000	1 0 0	rts.	May, 1902	8 5 0	8 7 6
Ferreira g., Transvaal	90,000	1 0 0	20 0	Feb., 1903	22 10 0	23 0 0
Geldenhuis Est., g., Transvaal	200,000	1 0 0	5 0	Feb., 1903	6 15 0	6 17 6
Geduld, g , Transvaal	400,000	1 0 0	rts.	Mar., 1902	8 0 0	8 2 6
Henry Nourse, g., Transvaal	125,000	1 0 0	8 0	Feb., 1903	9 0 0	9 5 0
Jagersfontein, d., Orange F. S	200,000	5 0 0	6 0	Nov., 1899	26 10 0	27 0 0
Jubilee, g., Transvaal	50,000	1 0 0	bonus.	Aug., 1902	5 5 0	5 10 0
Jumpers, Transvaal	100,000	1 0 0	5 0	Aug., 1899	3 17 6	4 2 6
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept., 1899	4 2 6	4 5 0
May Con., g., Transvaal	288,750	1 0 0	3 0	Feb., 1903	4 8 5	4 11 3
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Feb., 1903	5 10 0	5 15 0
Namaqua, c., Cape Colony	94,331	2 0 0	2 0	June, 1902	3 10 0	3 15 0
Primrose (New), g., Transvaal	325,000	1 0 0	2 0	Feb., 1903	3 17 6	4 0 0
Rand Mines, g., S. Africa	1,795,956	5 0	4 0	Aug., 1902	10 18 9	11 0 0
Robinson, g., Transvaal	750,000	5 0 0	6 0	Feb., 1903	10 15 0	11 0 0
Robinson Deep, g., Transvaal	950,000	1 0 0	5 0	May, 1899	5 5 0	5 7 6
Rose Deep, Transvaal	450,000	1 0 0	2 0	Feb. 1903	8 17 6	9 2 6
Salisbury, g., Transvaal	100,000	1 0 0	2 0	Mar., 1899	2 12 6	2 17 6
Sheba, g., Transvaal	1,075,000	1 0 0	6	July, 1898	1 2 6	1 5 0
Village Main Reef, Transvaal	400,000	1 0 0	5 0	Oct., 1902	8 12 6	8 17 6
Wemmer, Transvaal	80,000	1 0 0	10 0	Jan., 1903	12 10 0	13 0 0

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

LONDON. (*By Cable*).*

Name of Company.	Mar. 31. £.	s.	d.	Apr. 7 £.	s.	d.	Name of Company	Mar. 31. £.	s.	d.	Apr. 7. £.	s.	d.
Anaconda	5	15	0	5	15	0	Johannesburg Invest	3	7	6	3	7	6
British South Africa	3	5	0	3	5	0	Modderfontein	11	1	3	11	3	9
Camp Bird	1	11	0	1	11	0	Rand Mines	11	4	9	11	2	6
Con. Gold-Fields	7	18	9	7	15	0	Rio Tinto com	50	12	6	50	3	9
De Beers Con. def	21	12	6	21	11	3	Simmer & Jack	1	15	0	1	13	9
East Rand	8	6	3	8	7	6	Tomboy	2	2	0	2	0	0
El Oro, Mex	..	..	..	1	12	6							
Jagersfontein	26	17	6	26	17	6							

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Mar. 18.

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing Fr.
Boleo	Lower Cal	Copper	.....	500	176.00	1,520.00	1,510.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	22.00	22.00
Fraser River	Brit. Col'mb	Gold	250,000	25	.....	6.50	6.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	107.00	106.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	494.00	512.00
Nickel	N. Caled'nia	Nickel	15,000,000	250	22.50	472.00	481.00
Rebecca	Colo'do, U. S.	Gold	5,000,000	25	.....	0.75	0.75
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	645.00	684.00

TORONTO, ONT.* Apr. 4.

Name of Company.	par val	Prices. High.	Prices. Low.	Sales.	Name of Company	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.07	.04	.....	Granby Smelter	$10	500	450	.....
Cariboo (Mc. K.)	1	.16	.10	.....	Mountain Lion	1	.14	.10	.....
Cariboo (Hyd.)	1	.75	.....	.....	North Star	1	.15	.11	.....
Center Star	1	.32	.28	1,000	Nova Scotia Steel, com	100	105	100	.....
Crows Nest, C	100	350	300	.....	Payne	1	.21	.17	3,000
Dominion Coal, com	100	115	112½	.....	Rambler Cariboo	1	.35	.25	.....
Dominion S. & I	100	32	29¼	.....	Republic	1	.07	.05	.....
Dominion S. & I., pref	100	68½	64	.....	St. Eugene	1	.45	.35	.....
Fairview	1	.05¾	.04¾	.....	Virtue	1	.09	.06	1,000
Giant	1	.03½	.02	.....	War Eagle Con	1	.14	.09¾	.....

*Standard Stock and Mining Exchange. Total sales 5,000 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

ABRASIVES—	Cust.Meas.	Price.
Carborundum, f.o.b. Niagara Falls, Powd., F.FF.FFF.	lb.	$0.08
Grains	"	.10
Corundum, N. C.	"	.07@.10
Chester, Mass.	"	.04½@.05
Barry's Bay, Ont.	"	.07½@.09½
Mont., car-lots, f.o.b., Chicago	"	.07@.07½
Crushed Steel, f.o.b. Pittsburg	"	.05½
Emery, Turkish flour in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Naxos flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Chester flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"	.01½
Grains, in kegs	"	.02½
Crude, ex-ship N. Y.; Abbott (Turkey)	lg.ton	26.50@30.00
Kuluk (Turkey)	"	22.00@24.00
Naxos (Greek) h. gr.	"	26.00
Garnet, as per quality	sh.ton	25.00@35.00
Pumice Stone, Am. Powd	lb.	.01¾@.02
Italian, powdered	"	.01½
Lump, per quality	"	.04@.40
Rottenstone, ground	"	.02½@.04½
Lump, per quality	"	.06@.20
Rouge, per quality	"	.10@.30
Steel Emery, f.o.b. Pittsburg.	"	.07
ACIDS—		
Boracic, crystals	"	.10¾@.11
Powdered	"	.11¼@.11½
Carbonic, liquid gas	"	.12½
Chromic, crude	"	.20
Hydrofluoric, 30%	"	.03
48%	"	.05
60%	"	.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"	.06
ALCOHOL—Grain	gal.	2.41@2.43
Refined wood 95@97%	"	.60@.65
Purified	"	1.20@1.50
ALUM—Lump	100 lbs.	1.65
Ground	"	1.70
Porous	"	.80
Chrome, com'l	"	2.75@3.00
ALUMINUM—		
Nitrate	lb.	1.50
Oxide, com'l, common	"	.06½
Best	"	.20
Pure	"	.80
Hydrated	100 lbs.	2.60
Sulphate, com'l	"	1.25@1.50
AMMONIA—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.05½
AMMONIUM—		
Carbonate, lump	"	.07½
Powdered	"	.08¼
Muriate	"	.05¾
Lump	"	.09
Nitrate, white pure (99%)	"	.12
Phosphate, com'l	"	.09
Pure	"	.12
ANTIMONY—Glass	"	.30@.40
Needle, lump	"	.05½@.06
Powdered, ordinary	"	.05¾@.07¼
Oxide, com'l white, 95%	"	.09½
Com'l white, 95%	"	.12
Com'l gray	"	.07
Sulphuret, com'l	"	.16
ARSENIC—White powd.	"	.03@.03½
Red	"	.06½@.06¾
ASPHALTUM—		
Ventura, Cal.	sh.ton	32.00
Cuban	lb.	.01½@.03½
Egyptian, crude	"	.05½@.06
Trinidad, refined	sh.ton	35.00
San Valentino (Italian)	lg.ton	16.00
Seyssel (French), mastic	sh.ton	21.00
Gilsonite, Utah, ordinary	lb.	.03
Select	"	.03¾
BARIUM—		
Carb. Lump, 80@90%	sh.ton	25.00@27.50
92@98%	"	26.00@29.00
Powdered, 80@90%	lb.	.01¾@.02
Chloride, com'l	100 lbs.	1.67½@1.76
Chem. pure cryst	lb.	.05
Nitrate, powdered	"	.05¼
BARIUM	Cust.Meas.	Price.
Sulphate (Blanc Fixe)	lb.	$0.02
BARYTES—		
Am. Crude, No. 1	sh.ton	9.00
Crude, No. 2	"	8.00
Crude, No. 3	"	7.75
Foreign, gray	"	14.00
Snow white	"	17.00
Floated	"	18.75
BAUXITE—Ga. or Ala. Mines:		
First Grade	lg.ton	5.50
Second grade	"	4.75
BISMUTH—Subnitrate	lb.	2.00
Subcarbonate	"	2.25
BITUMEN—"B"	"	.03½
"A"	"	.05
BONE ASH	"	.02¼@.02½
BORAX	"	.07¼@.07½
BROMINE—Bulk.	"	.35
CADMIUM—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50
CALCIUM—Acetate, gray	"	1.40
" brown	"	.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh.ton	70.00
Carbonate, ppt.	lb.	.05
Chloride	100 lbs.	.70@.90
CEMENT—		
Portland, Am., 400 lbs.	bbl.	1.70@1.90
Foreign	"	1.65@2.25
"Rosendale," 300 lbs	"	.75
Slag cement, imported	"	1.65
CERESINE—		
Orange and Yellow	lb.	.13
White	"	.14
CHALK—Lump, bulk	sh.ton	3.25
Ppt. per quality	lb.	.04¼@.05¼
CHLORINE—Liquid	"	.30
Water	"	.10
CHROME ORE—		
(50% ch.) ex-ship N. Y.	lg.ton	24.75
Bricks f.o.b. Pittsburg	M	175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg.ton	8.25
Am. best, ex-dock, N. Y.	"	9.25
English, common	"	10.50
Best grade	"	17.00
Fire Clay, ordinary	sh.ton	4.25
Best	"	6.00
Slip Clay	"	5.00
COAL TAR PITCH	gal.	.08
COBALT—Carbonate	lb.	1.75
Nitrate	"	1.50
Oxide—Black	"	2.26@2.30
Gray	"	2.28@2.40
Smalt, blue ordinary	"	.06
Best	"	.20
COPPERAS—in bulk	100 lbs.	.42½
In bbls	"	.47½
COPPER—Carbonate	lb.	.18@.19
Chloride	"	.25
Nitrate, crystals	"	.25
Oxide, com'l	"	.19
CRYOLITE	"	.06½
EXPLOSIVES—		
Blasting powder, A.	25 lb. keg	.65
Blasting powder, B.	"	1.40
"Rackarock," A.	lb.	.25
"Rackarock" B.	"	.18
Judson R.R. powder	"	.10
Dynamite (20% nitro-glycerine)	"	.13
(30% nitro-glycerine)	"	.14
(40% nitro-glycerine)	"	.15
(50% nitro-glycerine)	"	.16½
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	.21
Glycerine for ultro, (32-2-10° Be.)	"	.13⅞@.14
FELDSPAR—Ground	sh.ton	8.00@9.00
FLINT PEBBLES—Dan. Best.	lg.ton	14.75
French, Best	"	11.75
FLUORSPAR—		
Am. lump. 1st grade	sh.ton	14.40
2d grade	"	13.90
Gravel and crushed, 1st gr	"	13.40
2d grade	"	12.40
Ground, 1st grade	"	17.90
Ground, 2d grade	"	16.50
Foreign, lump	"	8.00@12.00
Ground	"	11.50@14.00
FULLER'S EARTH—	100 lbs.	.80
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh.ton	$8.00
Pulverized	"	30.00
German, com. pulv.	lb.	.01¼@.01½
Best pulverized	"	.01½@.02
Ceylon, common pulv.	"	.02¾@.03½
Best pulverized	"	.04@.08
Italian, pulv.	"	.01m
GYPSUM—Ground	sh.ton	8.00@8.50
Fertilizer	"	7.00
Rock	lg.ton	4.00
English and French	"	14.00@16.00
INFUSORIAL EARTH—Gr'd.		
American best	"	20.00
French	"	37.50
German	"	40.00
IODINE—Crude	100 lbs.	2.45
IRON—Muriate	lb.	.05
Nitrate, com'l	"	.01¼
True	"	.04
Oxide, pure copperas color.	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@.03
KAOLIN—(See China Clay.)		
KRYOLITH—(See Cryolite.)		
LEAD—Acetate, white	"	.08¼@.08½
Brown	"	.06¼@.06½
Nitrate, com'l	"	.06½
" gran.	"	.08¼
LIME—Com., abt. 250 lbs.	bbl.	.80
Finishing	"	.90
MAGNESITE—Greece.		
Crude (95%)	lg.ton	6.00@6.50
Calcined	sh.ton	17.50@18.00
Bricks	M	170.00
Am. Bricks, f.o.b. Pittsburg	"	175.00
MAGNESIUM—		
Carbonate, light, fine pd.	lb.	.05
Blocks	"	.07@.09
Chloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulphate	100 lbs.	.75@.95
MANGANESE—Powdered, 70@75% binoxide	lb.	.01¼@.01½
Crude pow'd. 75@85% binoxide	"	.01½@.02¼
85@90% binoxide	"	.02¼@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore, 50%, Foreign	unit	.18@.19
Domestic	"	.20
MARBLE—Flour	sh.ton	6.00@7.00
MERCURY—Bichloride	lb.	.77
MICA—N. Y. gr'nd, coarse	sh.ton	33.00@38.00
Fine	lb.	.00¾@.02
Sheets, N. C., 2x4 in.	"	.30
3x3 in.	"	.80
3x4 in.	"	1.50
4x4 in.	"	2.00
6x6 in.	"	3.00
MINERAL WOOL—		
Slag, ordinary	sh.ton	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
NICKEL Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulphate	"	.20@.21
OILS—Black, reduced 29 gr.:		
25@30, cold test	gal.	.11½@.12½
15, cold test	"	.12½@.12¾
Zero	"	.13½@.13¾
Summer	"	.11@.12
Cylinder, dark steam ref.	"	.10¼@.11¾
Dark, filtered	"	.15½@.17½
Light, filtered	"	.16½@.19
Extra cold test	"	.27½@.31½
Gasoline, 86°@90°	"	.16@.21
Naphtha, crude, 68°@72°	bbl.	11.20
"Stove"	gal.	.14½
Linseed, domestic raw	"	.42@.46
Boiled	"	.48
Calcutta, raw	"	.75
OZOKERITE	lb.	.11½
PAINTS AND COLORS—		
Chrome green, common	"	.03
Pure	"	.16
Yellow, common	"	.10¼
Best	"	.25
Lampblack, com'l	"	.04½
Refined	"	.07
Litharge, Am. pow'd	"	.05⅝@.05¾
English flake	"	.08¼@.08½
Glassmakers'	"	.07¾@.08½
PAINTS AND COLORS—	Cust.Meas.	Price.
Metallic, brown	sh.ton	$19.00
Red	"	16.00
Ocher, Am. common	"	9.25@10.00
Best	"	21.25@25.00
Dutch, washed	lb.	.04¾
French, washed	"	.01¼@.01¾
Orange mineral, Am.	"	.08½@.08¾
Foreign, as to make	"	.08½@.10¼
Paris green, pure, bulk	"	.12
Red lead, American	"	.06¼@.06½
Foreign	"	.06¾@.07¾
Turpentine, spirits	gal.	.56@.56½
White lead, Am., dry	lb.	.05½@.05¾
American, in oil	"	.06¾@.06¾
Foreign, in oil	"	.07@.07¼
Zinc, white, Am., ex dry.	"	.04¾@.04¾
Foreign, red seal, dry	"	.06@.06½
Green seal, dry	"	.06¼@.06½
POTASH		
Caustic, ordinary	"	.04½@.04¾
Elect. (90%)	"	.06¼
POTASSIUM—		
Bicarbonate cryst	"	.08¼
Powdered or gran.	"	.14
Bichromate, Am.	"	.08½@.08¼
Scotch	"	.08½@.09
Bromide, bulk	"	.32
Carbonate (80@85%)	"	.03½@.04
Chlorate, f.o.b. works	"	.07@.07½
Foreign, f.o.b. N. Y.	"	.07½@.07¾
Chromate	"	.35
Cyanide (98@99%)	"	.20@.20½
Kainit	lg.ton	9.50
Manure salt, 20%	100 lbs.	.66
D'le Manure Salt, 48@53%	"	1.12
Muriate, 80@85%	"	1.83
95%	"	1.86
Permanganate	lb.	.09¼@.10
Prussiate, yellow	"	.13¼@.13½
Red	"	.34
Sulphate, 90%	100lbs.	2.11
96%	"	2.14
Sylvanit	unit	.41
QUARTZ—(See Silica).		
SALT—N. Y. com. fine 280 lbs	bbl.	.72@1.18
N. Y. agricultural	sh.ton	4.40
SALTPETRE—Crude	100 lbs.	3.35@3.40
Refined	"	4.25@4.62½
SILICA—Best foreign	lg.ton	10.00@11.00
Ground quartz, ord	sh.ton	6.00@8.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75
SILVER—Chloride	oz.	.65
Nitrate Crystals	"	.21
Oxide	"	.85@1.10
SODIUM—		
Bicarb., ordinary, f.o.b. w'ks	100 lbs	1.12½@1.25
Bichromate	"	1.60
Foreign, f.o.b. N. Y.	"	3.00
Extra domes., f.o.b. w'ks	lb.	.06¼
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.	.72½@.75
Foreign, f.o.b. N. Y.	"	.90@.92½
Caustic, 60@78%, f.o.b. w'ks	"	1.65@1.70
Foreign, f.o.b. N. Y.	"	1.90@2.00
Chlorate, com'l	"	.07¼@.07¾
Hyposulphite, Am.	100 lbs.	1.60@1.65
German	"	1.70@1.90
Nitrate, spot	"	2.10
Shipments	"	1.87½@2.00
Peroxide	lb.	.45
Phosphate	"	.02¼@.02¼
Prussiate	"	.09¾
Sal soda, f.o.b. works	100 lbs.	.53
Foreign, f.o.b. N. Y.	"	.67½
Silicate, conc.	"	.05
Com'l	"	.01
Sulphate, com'l	100 lb.	.82½
Sulphide	lb.	.01¾
Sulphite crystals	"	.02½
SULPHUR—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.15
TALC—N. C., 1st grade	sh.ton	18.00
N. Y., Fibrous, best	"	10.30
French, best	100 lbs.	1.25
Italian, best	"	1.62½
TAR—Regular	bbl.	2.40
Oil barrels	"	4.40
TIN—Crystals	lb.	.32
Oxide	"	.45
URANIUM—Oxide	"	2.25@3.00
ZINC—Metallic, ch. pure	"	.07@.09½
Carbonate, ppt.	"	.09
Chloride solution, com'l	"	.02¾
Chloride granular	"	.04¼@.04¾
Dust	"	.04¾@.04¾
Sulphate	"	.02½@.02¾

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.60
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.35
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07⅝@.08
THORIUM—Nitrate 49@50%.	"	4.50
URANIUM—Nitrate	oz.	.25
YTTRIUM—Nitrate	lb.	40.00
ZIRCONIUM—Nitrate	"	8.00

Note.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the Engineering and Mining Journal are requested to report any corrections needed, or to suggest additions which they may consider advisable.